151884

SUMMARY REPORT

TASK 2 - SITE DEFINITION ACTIVITIES RI/FS ECC SITE

ZIONSVILLE, INDIANA
EPA 18.5L30.0
W65230.C2
July 18, 1983

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Section

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SUBTASK 2-1

INTRODUCTION

This report summarizes the results of the ECC RI/FS Task 2 - Site Definition Activities. The subtasks, as originally scoped in the RI/FS Work Plan, were:

- o Gathering Backround Data
- o Site Safety Facilities
- o Prepare Site Health and Safety Assessment
- o Site Mapping
- o Work Plan Update and Report

The results for two additional subtasks have also been included in this report. These are:

- o Residential Well Sampling
- o Quality Assurance Project Plan

Subtask 2-1 Gathering Backround Data

Backround data were obtained from the ISBH, EPA, Ecology and Environment Inc, USGS and the Soil Conservation Service during preparation of the ECC RAMP. Approximately 240 documents were obtained from these sources. Additional data gathering performed for this subtask included a review of ISBH files for recent data or previously overlooked information. Also, new information was obtained from the USGS, the Agricultural Stabilization and Conservation Service (ASCS) of the U.S. Department of Agriculture and Dr. T.R. West (consultant to Northside Sanitary Landfill).

Significant data obtained as part of this subtask were:

- o "Water and Streambed Material Data, Eagle Creek Watershed, Indiana, August 1980, October and December 1982. "U.S. Geological Survey, Open-File Report 83-215.

- Aerial Photography from the ASCS. Four photos of the ECC site and the Northside Sanitary Landfill at a scale of 1:330 and covering 1 square mile were obtained for the years 1950, 1955, 1962, and 1972.

- Boring logs of wells and borings drilled at ECC and Northside Sanitary Landfill obtained from Dr. T.R. West.

The major activity of this subtask was the prepartion of a summary document of sampling and testing at ECC. The following Technical Memorandum 1 presents this information.

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TECHNICAL MEMORANDUM NO. 1:	Historical Sampling and Testing Summary
PROJECT SITE:	ECC, Zionsville, Indiana
PROJECT NUMBER:	CH2M HILL No. - W65230.C2 EPA Contract No. - 18.5L30.0
DATE:	July 18, 1983

This technical memorandum (TM) summarizes sampling and testing efforts conducted from 1976 through 1982, related to the ECC site. Sources of data were primarily laboratory data sheets or handwritten data summary tables, generally unaccompanied by descriptions of the sampling and testing procedures used. As such, much of the data summarized herein cannot be used as a basis for definitive interpretations of existing conditions onsite or offsite at ECC. Rather, the data should be used in qualitative assessments of contamination and in determining locations where further testing is needed. For locations where sampling, testing and quality control procedures are well documented, additional sampling may not be necessary.

Historical sampling and testing information for ECC is discussed under the following headings:

- Onsite surface water and sediment
- Offsite surface water and sediment
- Groundwater
- Residential well water
- Soil
- Aquatic biota

ONSITE SURFACE WATER AND SEDIMENT

SAMPLING AND TESTING

Table 1 summarizes the known surface water and sediment sampling events that have taken place onsite at ECC. Three general locations have been sampled: the cooling water pond, the north drum storage area pond, and the south drum storage area pond.

Sampling and testing procedures were not described for any of the events listed. However, all EPA samples were analyzed by labs selected and certified as part of the Contract Laboratory Program (CLP). Standard procedures are utilized by these labs for the analysis of organic and inorganic priority pollutants.

Table 1
ONSITE SURFACE WATER AND SEDIMENT SAMPLING
ECC SITE

Sampler	Sampling Date	Analytical Laboratory	Document Number	Sampling Location	No. of Samples Water	No. of Samples Sediment	Parameters Analyzed	Data Summary
ISBH	3/2/79	Water Laboratory, ISBH	24	Cooling water pond	1		COD, Pb, Hg, oil, phenol	Table 2
ISBH	6/8/79	Water Laboratory, ISBH	23	Cooling water pond; south storage area	2		As, Cd, Cr, Pb, Hg, Ni, Zn, oil, phenol, Cn^-	Table 2
ISBH	8/2/79	Water Laboratory, ISBH	33	Cooling water pond; south storage area	1		Oil, BOD, COD, Pb, Ni, Zn	Table 2
ISBH	11/2/79	Water Laboratory, ISBH	35	Cooling water pond; north and south storage areas	5		As, Cd, Cr, Pb, Hg, Ni, Zn, oil, phenol, pH	Table 2
ISBH	4/3/80	Water Laboratory, ISBH & Industrial Hygiene Laboratory	45	South storage area	1		PCB, Cd, Cr, Ni, Pb, Zn, Cu, phenol	Table 2
EPA	4/10/80	CLP[a]; W. Coast Technical Service, Inc.	47	Cooling water pond; south storage area	2		Organic priority pollutants	Table 3
ISBH	4/17/80	Water Laboratory, ISBH	48	North and south storage areas	2		As, Cd, Cr, COD, Cu, Pb, Ni, pH, phenol, Zn	Table 2
ISBH	3/10/81	Water Laboratory, ISBH	113	Cooling water pond	1	1	Metals, PCB's, volatile organics, others	Table 3
ISBH	4/29/81	Water Laboratory, ISBH	104	South storage area	2		Phenol, TOC, oil, volatile organics	Table 2
EPA	8/9/82	CLP	181	Cooling water pond	1		Organic priority pollutants	Table 3
EPA	10/18/82	CLP	209	Cooling water pond; north and south storage areas	4	1	Organic and inorganic priority pollutants	Table 3

[a] CLP = Contract Laboratory Program

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All of the Indiana State Board of Health (ISBH) samples were analyzed by the ISBH Water Laboratory. The lab analyzed blanks and surrogate spikes with each set of samples. Duplicates were only occasionally analyzed.

RESULTS

Analytical results are summarized in Tables 2 and 3. Table 2 presents the data for samples upon which only a limited analysis was performed. Table 3 summarizes the data for samples exposed to a more extensive analytical testing program.

The following inorganic chemicals were detected in the cooling water pond water samples at levels above EPA Water quality criteria:

- Cadmium
- Lead
- Mercury
- Nickel

A sample of the surficial oil layer from the north storage area pond taken on November 2, 1979, was found to contain arsenic, cadmium, chromium, lead, nickel, and zinc far in excess of the levels found for the pond water samples.

Listed in Table 3 are the organic priority pollutants found in at least one of the pond water samples above the detection limits. Background levels for these compounds are generally < 1 ppb. The following eleven substances were found in the pond water samples at levels above EPA water quality criteria:

- 1, 1, 2 Trichloroethane
- 1, 1, Dichloroethene
- Tetrachloroethene
- Trichloroethene
- Methylene chloride
- Chloroform
- Trichlorofluoromethane
- Toluene
- Phenol
- Benzene
- PCB's

Each of the onsite surface water areas sampled were found to contain levels of organic priority pollutants exceeding EPA water quality criteria.

One sample of the cooling water pond sediment was tested by the EPA. Inorganic pollutants reported in levels above

Table 2
ONSITE SURFACE WATER
LIMITED ANALYSIS
SAMPLING RESULTS (ppb)
ECC SITE

Water Quality Parameter	Cooling Water Pond				South Drum Storage Area Pond						North Drum Storage Area Pond			EPA Water Quality Criteria[a]
	03/02/79	06/08/79	08/02/79	11/02/79	06/08/79	11/02/79	11/02/79	04/03/80	04/17/80	04/29/81	11/02/79	11/02/79[f]	04/17/80	
Arsenic		4		11	1	6	4		18		60	900	7	0.022[c,d]
Cadmium		< 20		< 10	< 10	**40**	**160**	**70**	**38**		10	**300**	**17**	10[b]
Chromium		390		< 10	1,100	40	250	770	380		1.6	104,000	1,000	50[b,e]
Lead	**31,000**	**520**	**80**	< 20	**80**	**90**	**80**	**110**	40		0.3	**66,000**	**310**	50[b]
Mercury	< 10,000			< 0.5		< 0.5	< 0.5				**0.9**	< 200		0.144[b]
Nickel		**230**	70	**40**	**40**	50	**120**	**160**	**140**		90	**500**	30	13.4[b]
Zinc		580	290	150	2,300	140	260	290	90		1,090	18,000	3,100	NCA
Copper								460*	838*				11,100*	NCA
Phenol	8,800*			65,300*	28,000*	22,500*	25,500*	22,400*	13,000*	10,000*	35	3,000,000*	8,900*	3,500[b]
Oil	80,000,000	18,000,000	8,300	20,000	110,000	180,000	63,000			62,400	3,032,000			--
pH				6.3	2.0	7.3	7.2		6.9		7.1		7.1	--
BOD			1,800,000											--
COD	26,000,000								5,700,000				430,000,000	--
TOC			6,000,000							910,000				--
PCB								3.5						0.00079[c]

NCA = Insufficient data available upon which to derive a criterion.
Blank indicates parameter not analyzed. Bold type indicates parameter exceeds EPA water quality criteria.
[a] For the protection of human health assuming a daily ingestion of 2 liters of water, 1980.
[b] Toxicity criteria.
[c] Carcinogenicity criteria at the 10^{-5} risk level.
[d] Criteria applies to total trivalent arsenic.
[e] Criteria applies to total hexavalent chromium.
[f] Oil layer.
* Exceeds EPA water quality criteria for phenol

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Table 3
ONSITE SURFACE WATER AND SEDIMENT
SAMPLING RESULTS (ppb)
ECC SITE

Organic Priority Pollutants	Cooling Water Pond				Sediment	South Drum Storage Area Ponds			North Drum Storage Area Pond	EPA Water Quality Criteria [a]
	04/10/80	03/10/81	08/09/82	10/18/82	03/10/81	04/10/80	04/29/81 [f]	10/18/82	10/18/82	
1,1,-Dichloroethane	ND	4.4	17	ND	70	ND	< 5	ND	ND	NCA
1,1,1-Trichloroethane	6,821	< 900	831	1,322	730	ND	160	621	1,266	18,400 [b]
1,1,2-Trichloroethane	16		< 2.8			ND	< 5			6.0 [c]
1,1-Dichloroethene	152	< 300	95	ND		ND	< 5	ND	ND	0.33 [c]
1,2-Dichloroethene	259	< 50	2,022	2,848	230	48		1,541	2,766	NCA
Tetrachloroethene	1,297	190	12	0.6	< 100	ND	260	1,176	71	1.7 [c]
Trichloroethene	3,873	< 600	191	673	470	ND	320	1,176	1,398	6.0 [c]
Methylene Chloride	5,470	240	1,329	3,908	1,500	485	180	3,873	5,548	1.9 [c]
Chloroform	ND	59	21	ND	90	< 10	9.1	ND	ND	1.9 [c]
Trichlorofluoromethane	ND		< 2.7			14	< 5			1.9 [c]
Toluene	2,700	4,100			630	935	600,000			14,300 [b]
Nitrophenol	270		< 59			ND				NCA
Pentachlorophenol	38		< 170			103		5	ND	1,010 [b]
Phenol	1,930	1,200	15,000	396	< 200	ND		460	325	3,500 [b]
2,4-Dimethylphenol	ND		260	251		349		236	121	NCA
2,4,6-Trichlorophenol	ND		< 62	5		ND		4	3	12 [c]
Benzene	ND	< 300	< 0.5	ND	90	ND	< 8	ND	463	6.6 [c]
Methylbenzene	ND		858	974		ND		1,035	1,132	--
Ethylbenzene	ND	600	110	ND	330	1,188	310	ND	ND	1,400 [b]
1,3-Dimethylbenzene	ND		98	ND		ND		ND	ND	--
1,2 & 1,4-Dimethylbenzene	ND		79	ND		ND		ND	ND	--
1,3-Dichlorobenzene	ND		< 25	0.5		ND		17	92	400 [b]
1,4-Dichlorobenzene	ND		< 22	0.4		ND		15	86	400 [b]
1,2-Dichlorobenzene	ND		< 25	0.5		27		18	97	400 [b]
Diethylphthlate	27		86	47		433		32	ND	350,000 [b]
Dimethylphthlate	311		240	175		513		169	164	313,000 [b]
Butylbenzylphthalate	ND		< 290	1,122		ND		3,277	2,457	NCA
Di-n-butylphthalate	< 10		76	29		< 10		87	135	34,000 [b]
Napthalene	ND		< 23	12		ND		16	29	NCA
Isophorone	ND		3,200	ND		ND		ND	ND	5,200 [b]
P-Chloro-M-Cresol	ND				2,600	91				NCA
PCB's		< 50								0.00079 [c]

Table 3 (Continued)
ONSITE SURFACE WATER AND SEDIMENT
SAMPLING RESULTS (ppb)
ECC SITE

Organic Priority Pollutants	Cooling Water Pond 04/10/80	03/10/81	08/09/82	10/18/82	Sediment 03/10/81	South Drum Storage Area Ponds 04/10/80	04/29/81[f]	10/18/82	North Drum Storage Area Pond 10/18/82	EPA Water Quality Criteria[a]
Arsenic		4.7		6.0	10,000			5.9	5.7	0.022[c,d]
Cadmium		12		3.07				5.59	9.81	10[b]
Chromium		150		286	19,000			326	320	50[b,e]
Lead		120		< 70	14,000			96.0	179	50[b]
Mercury		0.2		< 0.1	30					0.144[b]
Nickel		30		184	18,000			201	169	13.4[b]
Zinc		390		397	54,000			956	1,510	NCA
Copper		300		29.8	26,000			72.3	124	NCA
Aluminum		900		1,190	10,000,000			2,770	3,030	--
Barium				138				172	183	--
Beryllium		< 10		< 1	700			< 1	< 1	0.037[c]
Cobalt				13.6				25.7	34.3	--
Iron				6,840				14,600	19,800	--
Manganese				2,370				2,370	1,960	--
Boron				712				684	389	--
Vanadium				8.6				13.3	12.6	--
Silver				< 3				< 3	< 3	50[b]
Antimony				2.2				< 2	< 2	146
Thallium				< 2				< 2	< 2	13[b]
Tin				< 40				< 40	62.6	--
Ammonia		200		5,290	< 100					--
Cyanide		52		16	< 625					200[b]

ND = Not Dectected.
NCA = Insufficient data available upon which to derive a criterion.
Blank indicates parameter not analyzed. Bold type indicates parameter exceeds EPA water quality criteria.
[a] For the protection of human health assuming a daily ingestion of 2 liters of water, 1980.
[b] Toxicity criteria.
[c] Carcinogenicity criteria at the 10^{-5} risk level.
[d] Criteria applies to total trivalent arsenic.
[e] Criteria applies to toal hexavalent chromium.
[f] Oil layer.

background levels in sediment were arsenic, aluminum, chromium, nickel and copper. Organic pollutants reported in levels above background were 1, 1, dichloroethane, 1, 1, 1, trichloroethane, 1, 1, dichloroethene, trichloroethene, tetrachloroethene, methylene chloride, chloroform, toluene, benzene, ethylbenzene and PCB's.

OFFSITE SURFACE WATER AND SEDIMENT

SAMPLING AND TESTING

Table 4 summarizes offsite surface water and sediment sampling events at ECC. The majority of sampling has been performed by the ISBH. The U.S. EPA performed one sampling episode. The United States Geologic Survey (USGS) performed three sampling episodes, collecting a total of 7 water samples and 15 sediment samples.

Sampling and testing procedure documentation was not found with any ISBH or EPA data. Testing procedures are known only in the general sense described earlier. Sampling and testing procedures employed by the USGS along with complete analytical result are described in: "Water and Streambed Material Data, Eagle Creek Watershed, Indiana, August 1980 and October and December 1982," Open File Report 83-215.

RESULTS

Analytical results for the offsite surface water samples are summarized in Tables 5 and 6. Figure 1 indicates sampling locations. Table 5 presents data for surface water samples where only a limited analysis was performed. Table 6 summarizes data for samples where a more extensive analysis was performed. Date are presented for only those water quality parameters that had reported levels higher than upstream levels for at least one location.

Two inorganic chemicals were detected in offsite surface waters above EPA water quality criteria levels. Lead was found at sampling location B (downstream of the confluence of the unnamed ditch and Finley Creek) at 80 ppb and at sample location Q (a small tributary to the unnamed ditch south of the landfill drive) at 250 ppb. Nickel was reported at 20 ppb at sample locations E (in the unnamed ditch alongside ECC) and K (upstream of ECC in the unnamed ditch).

These inorganic chemicals may be originating from ECC or Northside Sanitary Landfill. Nearly all sample locations

Table 4
OFFSITE SURFACE WATER AND SEDIMENT SAMPLING
ECC SITE

Sampler	Sampling Date	Analytical Laboratory	Document Number	Sampling Location[a]	No. of Samples		Chemicals Analyzed	Data Summary
					Water	Sediment		
John Bankert	9/15/76	O.A. Laboratories	19	Creek[b]	1		pH, COD, Fe, Cr, Ni, Pb, Zn, Cd, Cl	No
ISBH	6/8/79	Water Laboratory, ISBH	23	E	3		As, Cd, Cr, Pb, Hg, Ni, oil, pH, phenol, Zn, PCB	Table 5
ISBH	7/31/79	Water Laboratory, ISBH	33	Finley Cr, Unnamed Ditch, Eagle Creek	5		Oil	No
ISBH	8/2/79	Water Laboratory, ISBH	33	E, F	2		Oil, BOD, COD, Pb, Ni, Zn	Table 5
ISBH	11/2/79	Water Laboratory, ISBH	35	E, K	2		As, Cd, Cr, Pb, Hg, Ni, oil, pH, phenol, Zn	Table 5
EPA	4/10/80	CLP - W. Coast Technical Services, Inc.	47	E, J, K	3		Organic priority pollutants	Table 6
ISBH	4/17/80	Water Laboratory, ISBH	48	C, G, H, K	4		As, Cd, Cr, Cu, Pb, Ni, Zn, COD, pH, phenol	Table 5
ISBH	8/25/80	Water Laboratory, ISBH	65A	A, B, L, M	4		PCB, As, Cu, Pb, Zn, diazinon	Table 5
USGS	8/25/80	USGS Laboratory	240	A, C, O, P (also see Appendix A-1)		11	Metals, pesticides, PCB, others	Table 7
ISBH	3/10/81	Water Laboratory, ISBH	113	A, C, E, N, P, Q, R (also see Appendix A-2)	13	14	Metals, pesticides, PCB, volatile organics, others	Table 6&7
ISBH	9/4/81	Water Laboratory, ISBH	137	B, E, H, I	4		Oil	No
ISBH	10/30/81	Water Laboratory, ISBH	149	D	1		Organic priority pollutants	Table 6
USGS	10/26/82	USGS Laboratory	240	A, P, S (also see Appendix A-1)	4	4	Organic and inorganic priority pollutants	Tables 6&7
USGS	12/14/82	USGS Laboratory	240	A, S (also see Appendix A-1)	3		Organic and inorganic priority pollutants	Table 6

[a] See Figure 1 for sample locations.
[b] Sampling location unknown.

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Table 5
OFFSITE SURFACE WATER
LIMITED ANALYSIS
SAMPLING RESULTS (ppb)
ECC SITE

	SAMPLE LOCATIONS DOWNSTREAM OF ECC									SAMPLE LOCATIONS UPSTREAM OF ECC				EPA Water
Water Quality	A	B	C	E			F	G	H	K		L	M	Quality
Parameter	08/25/80	08/25/80	04/17/80	06/08/79	08/02/79	11/02/79	08/02/79	04/17/80	04/17/80	11/02/79	04/17/80	08/25/80	08/25/80	Criteria[a]
Arsenic	1	3	3	4		3		18	1	1	1	2	ND	0.022[c,d]
Cadmium			2	< 10		< 10		< 2	< 2		< 2			10[b]
Chromium	10	60	160	< 10		< 10		< 10	< 10	< 10	< 10	13	10	50[b,e]
Lead	50	80	20	< 20	< 20	20	< 20	< 20	< 20	< 20	< 20	30	20	50[b]
Mercury				< 0.1		< 0.1				< 0.1				0.144[b]
Nickel			10	20	< 20	20	< 20	10	< 10	20	< 10			13.4[b]
Zinc	76	79	80	20	< 20	< 20	< 20	10	< 10	20	< 10	70	148	NCA
Copper			65					6	4		< 4			NCA
Phenol			9,800	2,000		< 5		1,500	< 5	7	< 5			3,500[b]
Oil				3,400	< 1	2,800	< 1			42,000				--
pH			7.2	1.7		7.2		6.8	7.7	7.3	7.7			--
BOD					22,000		22,000							--
COD			1,500,000		46,000		40,000	1,600,000	17,000		9,000			--
PCB	120	10		< 0.1								10	1	0.00079[c]

ND = Not detected.
NCA = Insufficient data available upon which to derive a criterion.
Blank indicates parameter not analyzed. Bold type indicates parameter exceeds EPA water quality criteria.
[a] For the protection of human health assuming a daily ingestion of 2 liters of water, 1980.
[b] Toxicity criteria.
[c] Carcinogenicity criteria at the 10^{-5} risk level.
[d] Criteria applies to total trivalent arsenic.
[e] Criteria applies to total hexavalent chromium.

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Table 6

OFFSITE SURFACE WATER SAMPLING RESULTS (ppb)

ECC SITE

	SAMPLE LOCATIONS DOWNSTREAM OF ECC										
	S		A			C	D	E		R	Q
Water Quality Parameter[a]	10/26/82	12/14/82	03/10/81	10/26/82	12/14/82	03/10/81	10/30/81	04/10/80	03/10/81	03/10/81	03/10/81
Aluminum	480	100	100	300	100	100			200	100	12,000
Arsenic	4	2	0.7	6	3	1.1			0.8	0.6	4.0
Barium	200	200		400	100						
Copper	12	4	5	9	8	4			4	5	17
Iron	890	340		3,600	420						
Lead	6	3	< 10	5	5	10			10	20	250
Manganese	120	70		280	80						
Magnesium			116			116			100	112	924
Zinc	10	20	< 10	10	30	< 10			< 10	10	60
Strontium			170			170			150	120	650
COD			21			4			4	5	17
1,1 Dichloroethene	< 1	< 1	< 1	< 1	140	< 3	< 5	ND	< 1	< 6	< 1
1,1 Dichloroethane	< 1	< 1	1.9	220	< 1	26	6	ND	1.2	< 1	< 1
1,2 Trans-dichloroethene	< 1	< 1	< 20	1,000	9	< 20	< 5	45	< 1	< 20	< 20
Methylene Chloride	< 1	< 1	1.1	< 1	< 1	18	350	< 10	3.5	< 10	< 1
Trichloroethene	< 1	2	4.4	670	23	33	10	122	1	< 12	< 12
Tetrachloroethene	< 1	1	1.2	37	< 1	2	1.8	< 10	< 1	1.2	2
Toluene	< 1	2	< 3	7	2	5	< 6	< 10	< 3	< 3	< 3
1,1,1 Trichloroethane	< 1	< 1	5.9	510	< 1	30	570	ND	< 1	9.1	5.6
Chloroform	< 1	< 1		< 1	< 1		11.5	< 10			< 6
1,1,2 Trichloro-1,2,2-trifluoromethane	< 1	< 1	< 2	< 1	< 1	< 40	< 5	ND	< 10	54	< 2
Methyl ethyl ketone			< 52			270	1,900	ND	210	< 26	< 26
2,4 Dimethylphenol	< 1	< 1		12	< 1		< 10	ND			
Phenol	< 1	< 1	< 0.2	2,200	< 1	< 0.2	< 10	14	< 0.2	< 0.2	< 0.2
Butyl benzl phthalate	< 1	< 1		11	< 1		< 100	ND			
Bis (2-chloroethyl) ether	< 1	< 1		43	< 1		< 10	ND			
1-2 Dichlorobenzene	< 1	< 1		57	< 1		< 10	< 10			
Diethyl phthalate	< 1	< 1		6	< 1		< 20	ND			
Dimethyl phthalate	< 1	< 1		16	< 1		< 20	ND			
Di-n-butyl phthalate	< 1	< 1		27	< 1		< 30	< 10			
Bis (2-ethylhexyl)phthalate	< 1	< 1	< 0.35	13	< 1	< 0.35	< 100	ND	< 0.35	< 0.35	< 0.35
Isophorone	< 1	< 1		360	< 1			ND			
n-Nitrosodimethylamine	< 1	< 1		9	< 1		-	ND			

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Table 6 (continued)

OFFSITE SURFACE WATER SAMPLING RESULTS (ppb)

ECC SITE

Water Quality Parameter[a]	SAMPLE LOCATIONS UPSTREAM OF ECC					EPA Water Quality Criteria[b]
	J	K	N	P		
	04/10/80	04/10/80	03/10/81	03/10/80	10/26/82	
Aluminum			100	100	80	--
Arsenic			0.2	0.7	3	0.022[d,e]
Barium					200	--
Copper			< 4	< 4	9	NCA
Iron					530	--
Lead			10	< 10	6	50[c]
Manganese					110	--
Magnesium			200	220		--
Zinc			< 10	< 10	10	NCA
Strontium			90	160		--
COD			6	8		--
1,1 Dichloroethene	ND	ND	< 1	< 1	< 1	0.33[d]
1,1 Dichloroethane	ND	ND	< 1	< 1	< 1	NCA
1,2 Trans-dichloroethene	ND	ND	< 1	< 1	< 1	NCA
Methylene Chloride	< 10	< 10	1.3	< 1	< 1	1.9[d]
Trichloroethene	ND	ND	< 1	< 1	< 1	27[d]
Tetrachloroethene	ND	ND	< 1	< 1	5	8[d]
Toluene	ND	ND	< 3	< 3	3	14,300[c]
1,1,1 Trichloroethane	ND	ND	< 1	< 1	< 1	18,400[c]
Chloroform	< 10	< 10			< 1	1.9[d]
1,1,2 Trichloro-1,2,2-trifluoromethane	ND	ND	< 2	< 2	< 1	--
Methyl ethyl ketone	ND	ND	< 26	< 26		--
2,4 Dimethylphenol	ND	ND			< 1	NCA
Phenol	ND	ND	< 0.2	< 0.2	< 1	3,500[c]
Butyl benzl phthalate	< 10	ND			< 1	NCA
Bis (2-chloroethyl) ether	ND	ND			< 1	0.3[d]
1-2 Dichlorobenzene	ND	ND			< 1	400[c]
Diethyl phthalate	< 10	< 10			< 1	350,000[c]
Dimethyl phthalate	ND	ND			< 1	313,000[c]
Di-n-butyl phthalate	< 10	ND			< 1	34,000[c]
Bis (2-ethylhexyl)phthalate	< 10	< 10	< 0.35	< 0.35	< 1	15,000[c]
Isophorone	ND	ND			< 1	5,200[c]
n-Nitrosodimethylamine	ND	ND			< 1	--

ND = Not Detected

NCA = Insufficient data available upon which to derive a criterion.

Blank indicates parameter not analyzed. Bold type indicates parameter exceeds EPA water quality criteria.

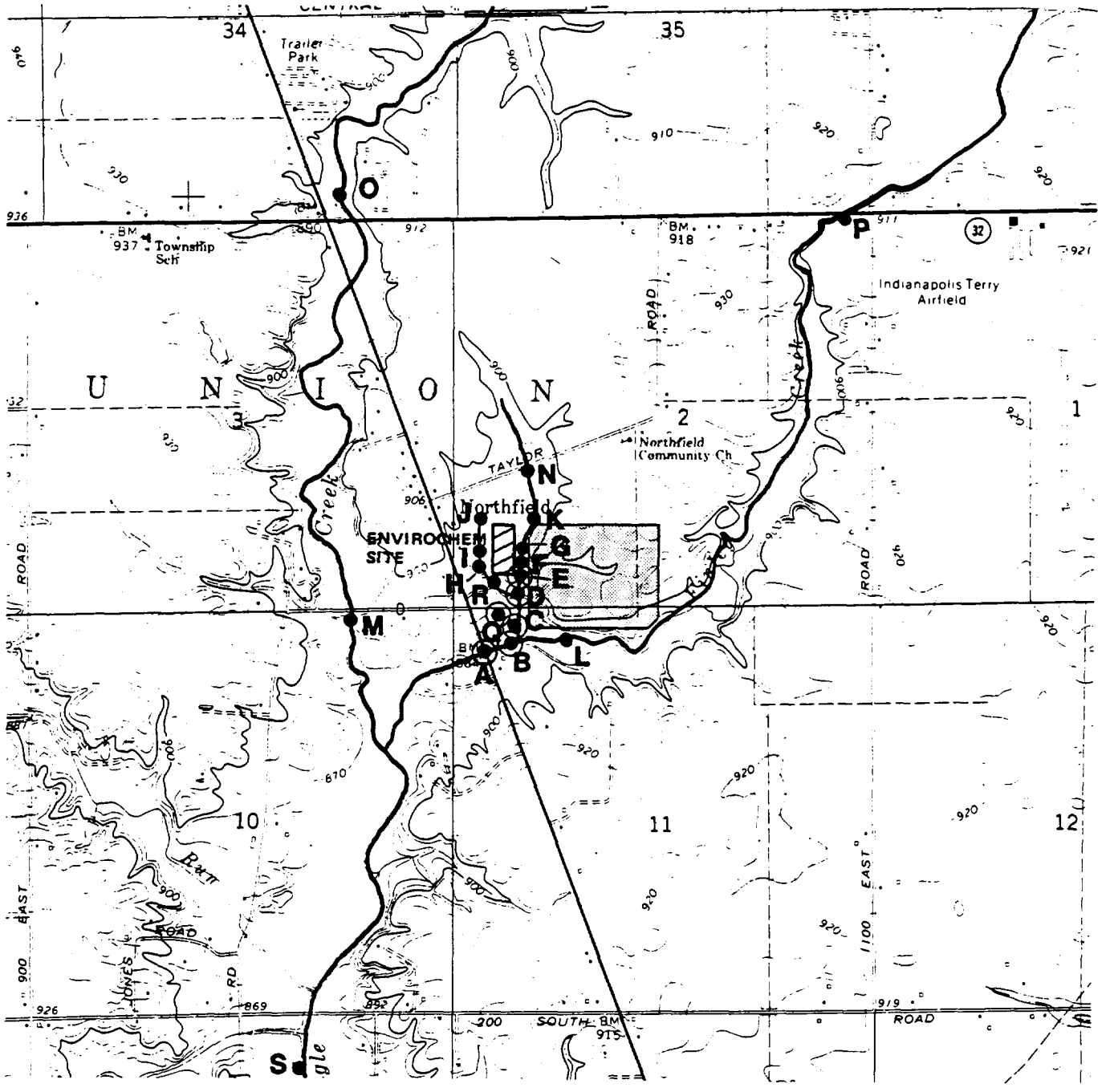
[a] Parameters listed are only those that vary substantially from upstream value. See Appendix A for complete results.

[b] For the protection of human health assuming a daily ingestion of 2 liters of water, 1980.

[c] Toxicity criteria.

[d] Carcinogenicity criteria at the 10^{-5} risk level.

[e] Criteria applies to total trivalent arsenic.



LEGEND

- NORTHSIDE LANDFILL
- SITE
- APPROXIMATE SAMPLE SITES
- SAMPLE LOCATION WITH AT LEAST ONE CONTAMINANT ABOVE EPA WATER QUALITY CRITERIA

N

0 4000

2000

SCALE IN FEET

FIGURE 1
OFFSITE SURFACE WATER SAMPLE LOCATIONS
ECC SITE

downstream of ECC showed at least one inorganic chemical at levels above the upstream values.

Eight organic priority pollutants were detected in surface water downstream of ECC at levels in excess of EPA water quality criteria. These pollutants, were:

- 1,1 Dichloroethene
- Methylene chloride
- Trichloroethene
- Tetrachloroethene
- Chloroform
- Bis (2-chloroethyl)ether
- Phenol
- PCB's

These were reported at sample locations A, B, C, D, and E (Figure 1).

Analytical results for surface water sediment samples are presented in Table 7. As with Table 6, this table only presents data for parameters that had as least one reported level greater than upstream values. Six compounds were reported at levels above upstream values: arsenic, chromium, copper, lead, DDD and PCB's.

GROUNDWATER

SAMPLING AND TESTING

Sampling and testing of groundwater from monitoring wells at ECC is summarized in Table 8. Two monitoring wells were located onsite (Figure 2). Sampling has been performed by the ISBH on four occasions and by John Bankert on one occasion. Sampling results from the seven monitoring wells located along the perimeter of the Northside Sanitary Landfill are not summarized here.

Documentation of sampling and testing procedures was not found with any of the data. ISBH testing procedures are as described earlier. Testing procedures by O.A. Laboratories, Inc., laboratory for John Bankert, were not researched since only two samples were subjected to limited analyses.

RESULTS

Analytical results are summarized in Table 9. Complete organic and inorganic priority pollutant analyses have not been

Table 7
OFFSITE SURFACE WATER SEDIMENTS (ppb)
SAMPLING RESULTS
ECC SITE

Sediment Quality Parameter[a]	SAMPLE LOCATION DOWNSTREAM OF ECC									SAMPLE LOCATIONS UPSTREAM OF ECC				
	S	A			C		E	Q	R	N	O	P		
	10/26/82	08/25/80	03/10/81	10/26/82	08/25/80	03/10/81	03/10/81	03/10/81	03/10/81	03/10/81	08/25/80	08/25/80	03/10/81	10/26/82
Arsenic	§ 1,000	1,000	5,700	1,000	3,000	4,400	10,000	5,200	8,800	6,500	§ 1,000	2,000	6,600	1,000
Chromium	3,000	10,000	9,000	40,000	60,000	6,000	9,000	3,000	11,000	4,000	10,000	13,000	3,000	4,000
Copper	8,000	20,000	27,000	21,000	20,000	8,000	20,000	10,000	16,000	11,000	20,000	20,000	8,000	11,000
Lead	30,000	50,000	160,000	120,000	80,000	48,000	11,000	18,000	89,000	17,000	20,000	30,000	7,000	20,000
DDD	0.5	§ 0.1		3.3	§ 0.1						§ 0.1	0.6		0.7
PCB's	5	120	§ 1,000	72	10	§ 1,000	§ 1,000	§ 0.5	§ 1,000	§ 1,000	1	10	§ 1,000	13

[a] Sediment quality parameters listed are only those that vary substantially from upstream values.

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Table 8
GROUNDWATER SAMPLING
ECC SITE

Sampler	Sampling Date	Analytical Laboratory	Document Number	Monitoring Well Location[a]	No. of Samples	Parameters Analyzed	Data Summary
John Bankert	9/15/76	O.A. Laboratories	19	1, 2	2	pH, COD, Fe, Cr, Cr^{+6}, Ni, Pb, Zn, Cd, Cl^-	Table 9
ISBH	8/14/79	Water Laboratory, ISBH	29	1, 2	2	Cl^-, Fe, COD, Fe, TS, Hardness, Sulfates	None
ISBH	3/17/81	Water Laboratory, ISBH	86	1, 2	2	Metals, volatile organics, others	Table 9
ISBH	7/2/81	Water Laboratory, ISBH	121	1, 2	2	Metals, volatile organics, others	Table 9
ISBH	11/29/82	Water Laboratory, ISBH Hygrid Laboratory	243	2	2	Metals, volatile organics, others	Table 9

[a] Well depths as follows: 1 = 71', 2 = 36'

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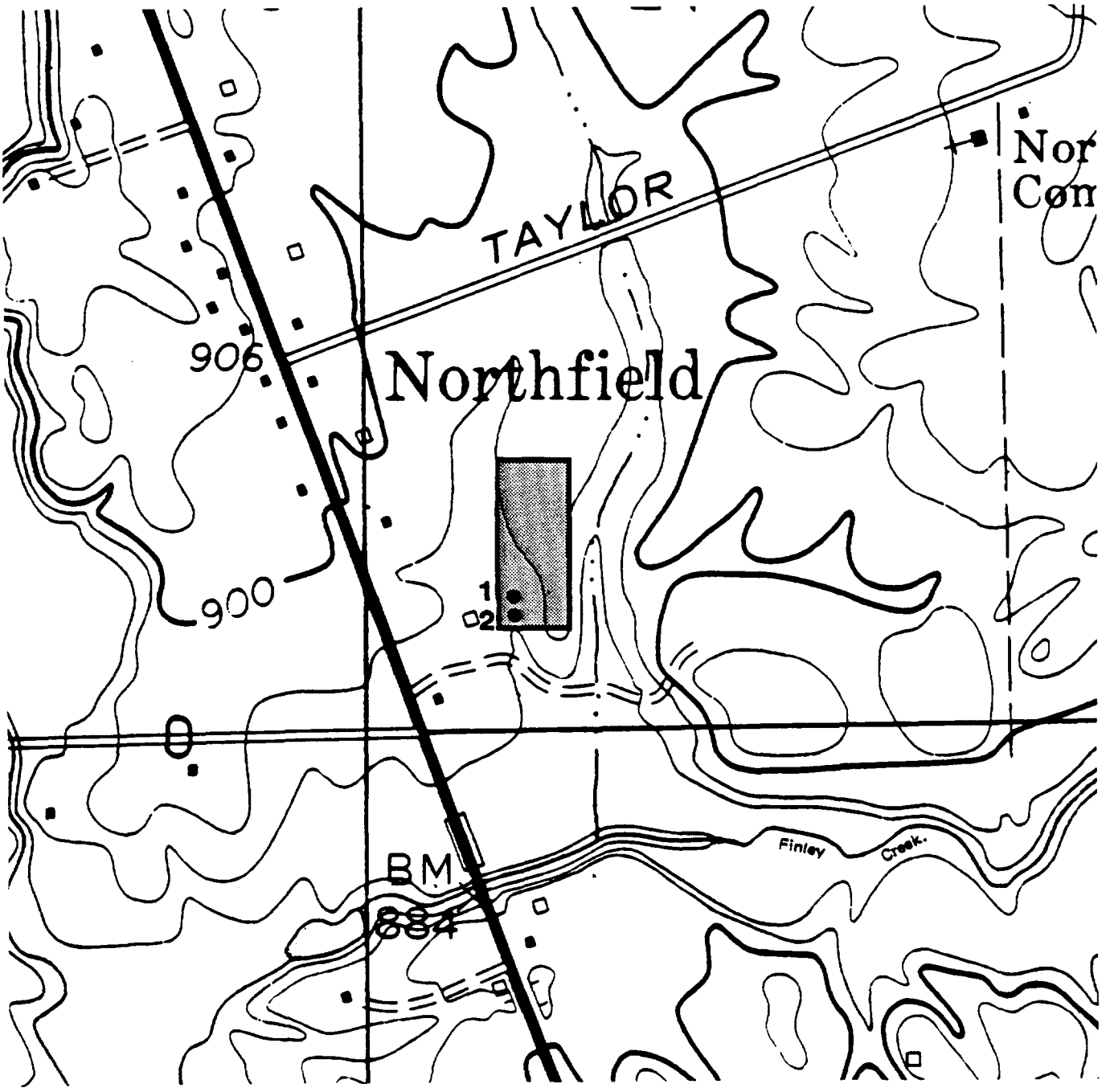

LEGEND

● APPROXIMATE MONITORING WEIR LOCATION

N

0 1000

500

SCALE IN FEET

FIGURE 2
MONITORING WELL LOCATIONS
ECC SITE

Table 9
GROUNDWATER SAMPLING (ppb)
ECC SITE

Water Quality Parameter	MONITOR WELL 1			MONITOR WELL 2					EPA Water Quality Criteria[a]
	09/15/76	03/17/81	07/02/81	09/15/76	03/17/81	07/02/81	01/29/82	01/29/82	
Aluminum		< 100			100				
Arsenic		50	150		2.6	0.2	38	32	0.022[c,d]
Barium			130			50			--
Copper		< 4	< 4		18	< 4			NCA
Chromium	< 100	< 10	15	< 100	< 10	< 10			50[b,e]
Cyanide		< 5			< 5				200[b]
Cadmium	< 100	< 2	< 2	< 100	< 2	< 2	< 2	< 2	10[b]
Iron	2,600		2,000	32,000		< 50			--
Lead	< 100	< 10	< 10	< 100	< 10	< 10	< 10	10	50[b]
Magnesium		88,000			88,000				--
Nickel	< 100	< 10	< 10	< 100	< 10	< 10			13.4[b]
Strontium		1,000			50				--
Zinc	70	10	< 10	290	790	< 10			NCA
TOC			3,900			2,100	28	31	--
COD	16,000	< 5,000	26,000	125,000	< 5,000	10,000	240	220	--
pH (lab)	8.18	7.7	8.0	8.55		7.6	7.1	7.1	--
1,2,-Dichloroethane		< 1	< 1		< 12	2.4	< 10	< 100	9.4[c]
1,1 Dichloroethane		< 1	< 1		50	41	160	130	NCA
1,1 Dichloroethene			< 1		< 1	< 1	< 2	< 1	0.33[c]
1,2 Transdichloroethene		< 1	< 1		< 1	< 1	580	500	NCA
Methylene Chlorine		< 1	< 1		5.7	< 1	14	32	1.9[c]
Trichloroethene		< 1	< 1		10	58	7.6	< 10	27[c]
Tetrachloroethene		< 1	< 1		< 1	< 1	< 10	< 100	8[c]
Trichlorofluoromethane		< 2	< 1				< 10	< 10	1.9[c]
1,1,1 Trichloroethane		< 1	< 1			1.2	30	< 100	18,400[b]
Chloroform			< 1			< 1	< 10	< 100	1.9[c]
1,1,2 Trichloro-1,2,2-trifluoromethane		< 2			< 2		ND	ND	--
bis(2-ethylhexyl)phthalate		< 350			< 350				15,000[b]
Methyl ethyl ketone		< 25	< 26		< 25	< 26	2,300	2,600	--

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Table 9 (Continued)
GROUNDWATER SAMPLING (ppb)
ECC SITE

Water Quality Parameter	MONITOR WELL 1			MONITOR WELL 2					EPA Water Quality Criteria[a]
	09/15/76	03/17/81	07/02/81	09/15/76	03/17/81	07/02/81	01/29/82	01/29/82	
Phenol		< 200			< 200				3,500[b]
Ethyl benzene			< 4			< 4	13	13	1,400[b]
Toluene		< 4	< 4		< 4	5.5	13	15	14,300[b]
Xylene		< 8	< 8		< 4	< 8	< 60	< 60	--
Diazanon		< 0.3			< 0.3				--
Isophorone							47	110	5,200[b]
PCB		< 0.5			< 0.5				0.00079[c]

NCA = Insufficient data available upon which to derive a criterion.
Blank indicates parameter not analyzed. Bold type indicates parameter exceeds EPA water quality criteria.
[a] For the protection of human health assuming a daily ingestion of 2 liters of water, 1980.
[b] Toxicity criteria.
[c] Carcinogenicity criteria at the 10^{-5} risk level.
[d] Criteria applies to total trivalent arsenic.
[e] Criteria applies to total hexavalent chromium.

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performed on any groundwater samples. For the samples tested to date, no inorganic pollutants were found at levels exceeding EPA water quality criteria. Two of the twelve organic priority pollutants were detected at levels above EPA water quality criteria. These were methylene chloride and trichloroethene. Other organic pollutants reported at levels above the detection limit were: 1, 2 - dichloroethane, 1, 1, dichloroethane, 1, 2 trans-dichloroethene, 1, 1, 1 trichloroethane, methyl ethyl ketone, toluene and isophorone.

RESIDENTIAL WELL WATER

SAMPLING AND TESTING

Residential well water sampling and testing activities are summarized in Table 10. Four sampling episodes have been performed by the ISBH and one by Ira Jennings, a homeowner near ECC. Locations of the residential wells sampled are shown in Figure 3.

Documentation of sampling and testing procedures was not found with any of the data. ISBH testing procedures are as described earlier. Sampling of the Ira Jennings well was by Mr. Jennings. The sampling procedures used by him are unknown. Analysis of the sample was performed by Environmental Consultants, Inc. Testing and quality control procedures employed by the laboratory were not researched since only one sample was analyzed.

RESULTS

Analytical results are summarized in Tables 11 and 12. Table 11 is a summary of residential well water sampling results for water quality parameters where levels above detection limits were reported. Table 12 is a list of additional organic pollutants analyzed by ISBH and not found above detection limits in any wells. Complete organic and inorganic priority pollutant analyses have not been performed on any well water samples prior to the onset of Superfund activities at the site.

The sample of the Ira Jennings well was the only sample where a water quality parameter was detected at levels above the EPA water quality criteria. Lead, methylene chloride, 1, 1, 2 trichloroethane and tetrachloroethene were found to be above the EPA water quality criteria.

Table 10
RESIDENTIAL WELL WATER SAMPLING
ECC SITE

Sampler	Sampling Date	Analytical Laboratory	Document Number	Sampling Location	No. of Water Samples	Parmeters Analyzed	Data Summary
ISBH	8/14/79	Water Laboratory, ISBH	29	2	1	Cl^-, COD, Fe, Hardness, Sulfate	Table 11
ISBH	9/5/80	Water Laboratory, ISBH	71	3, 7, 9, 10, 13	5	Cd, Cr^{+6}, COD, Cu, Fe, Pb, pH, phenol, TOC Hardness, Cl^-	Table 11
ISBH	3/5/81	Water Laboratory, ISBH	83	1, 2, 4, 5, 6, 7, 11, 12, 14	9	Metals, PCB, volatile organics, others	Tables 11,12
Ira Jennings	6/26/82	Environmental Consultants, Inc.	241	8	1	Metals, methylene chloride, 1,1,2 trichloroethane, tetrachloroethene	Table 11
ISBH	12/9/82	Water Laboratory, ISBH	242	1	1	Volatile organics, others	None[a]

[a] No parameters with values above detection limits.

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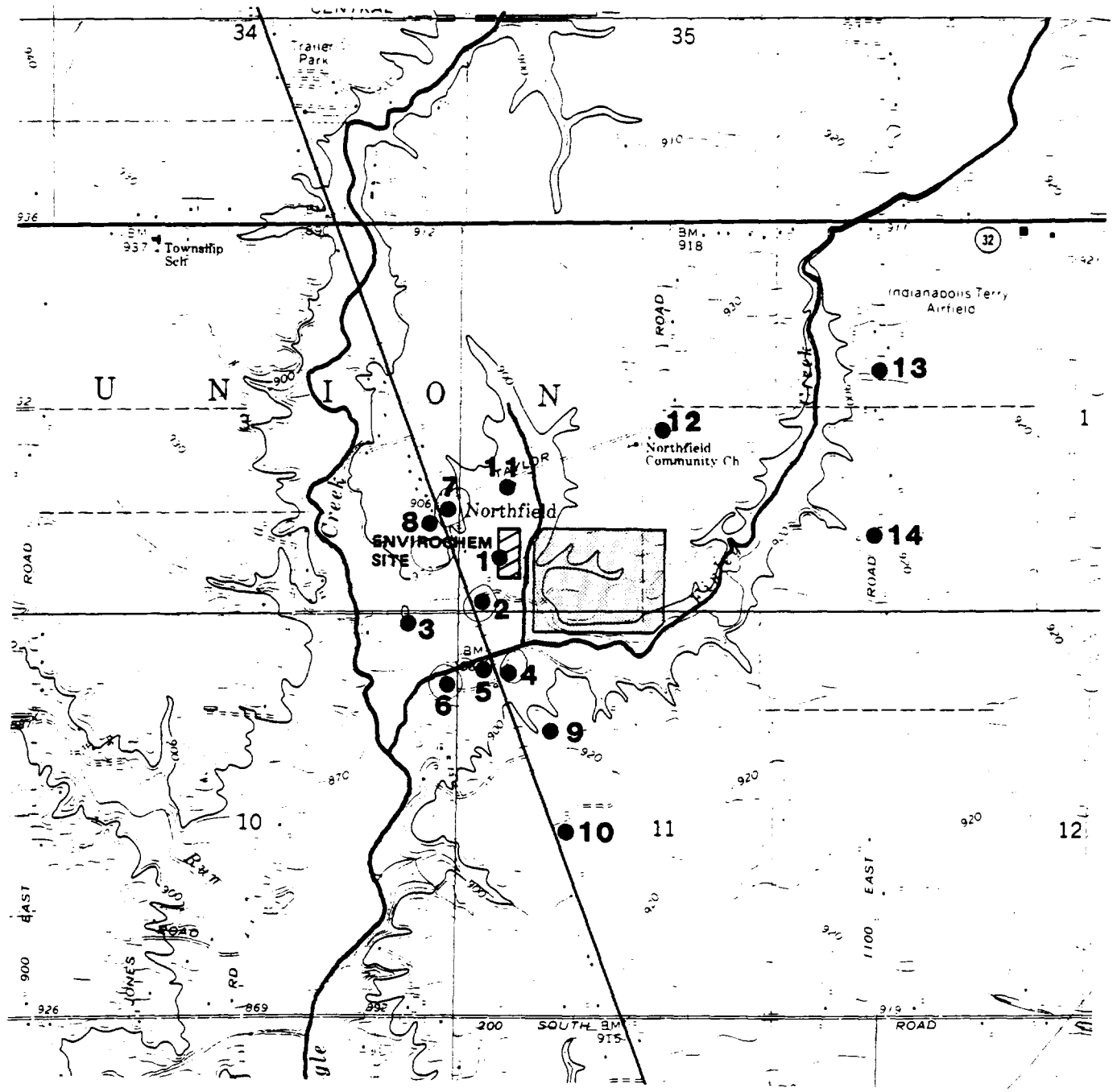

LEGEND

- NORTHSIDE LANDFILL
- SITE
- RESIDENTIAL WELLS SAMPLED

N

0 4000

2000

SCALE IN FEET

FIGURE 3
RESIDENTIAL WELL SAMPLING LOCATIONS
ECC SITE

Table 11

RESIDENTIAL WELL WATER SAMPLING RESULTS (ppb)

ECC SITE

	1	2		3	4	5	6	7		8	9	10	11
Water Quality Parameter	03/05/81	08/04/79	03/05/81	09/05/80	03/05/81	03/05/81	03/05/81	09/05/80	03/05/81	06/26/82	09/05/80	09/05/80	03/05/81
Aluminum	< 100		< 100		< 100		< 100		< 100				< 100
Arsenic	0.9		0.8		< 0.2	< 0.2	0.3		3.1	10			0.4
Beryllium	< 10		< 10		< 10	< 10	< 10		< 10				< 10
Cadmium	< 2		< 2	< 2	< 2	< 2	< 2	< 2	< 2	9	< 2	< 2	< 2
Chromium-hex.	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10		< 10	< 10	< 10
Chromium-tot.	< 10		< 10		< 10	< 10	< 10		< 10	< 3			< 10
Cyanide (free)	< 5		< 5		< 5	< 5	< 5		< 5				< 5
Iron	960	3,100	3,000	2,850	1,000	1,100	1,100	3,050	2,600		260	2,880	2,800
Lead	< 10		< 10	< 20	< 10	< 10	< 10	< 20	< 10	93	< 20		< 10
Mercury	< 0.1		< 0.1		< 0.1	< 0.1	< 0.1		< 0.1	< 0.5			< 0.1
Strontium	500		500	700	700	800		500				700	
Copper				11	< 4	< 4		< 4	< 4		26	< 4	6
Phenol				< 5				< 5			< 5	< 5	
Barium										403			
TOC				5,200				< 1,000			2,400	3,000	
COD		8,000		14,000				7,000			9,000	11,000	
Hardness ($CaCo_3$)	272,000	332,000	356,000	248,000	268,000	272,000	272,000	424,000	432,000		224,000	288,000	348,000
Chlorides	< 5,000	7,000	10,000	< 5,000	< 5,000	< 5,000	< 5,000	16,000	15,000		6,000	5,000	7,000
pH (lab)	6.9		6.7	7.0	6.9	6.9	6.9	6.7	6.6		7.1	7.1	6.8
Methylene Chloride										20			
1,1,2 trichloroethane										31			
tetrachloroethene	< 1		< 1		< 1	< 1	< 1		< 1	46			< 1

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Table 11 (Continued)
RESIDENTIAL WELL WATER SAMPLING RESULTS (ppb)
ECC SITE

Water Quality Parameter	12 03/05/81	13 09/05/80	14 03/05/81	EPA Water Quality Criteria[a]
Aluminum	< 100		< 100	--
Arsenic	16		26	0.022[c,d]
Beryllium	< 10		< 10	300,000[c]
Cadmium	< 2	< 2	< 2	10[b]
Chromium-hex.	< 10	< 10	< 10	50[b]
Chromium-tot.	< 10		< 10	170,000[b]
Cyanide (free)	< 5		< 5	200[b]
Iron	3,900	1,030	2,300	--
Lead	< 10	< 20	< 10	50[b]
Mercury	< 0.1		< 0.1	0.144[b]
Strontium	1,000		1,500	--
Copper	< 4	< 4	< 4	NCA[b]
Phenol		< 5		3,500[b]
Barium				--
TOC		5,500		--
COD		14,000		--
Hardness ($CaCo_3$)	300,000	188,000	258,000	--
Chlorides	9,000	< 5,000	< 5,000	--
pH (lab)	6.9	7.3	6.9	--
Methylene Chloride				1.9[c]
1,1,2 trichloroethane				6.0[c]
tetrachloroethene	< 1		< 1	8.0[c]

NCA = Insufficient data available upon which to derive a criterion.
Blank indicates parameter not analyzed. Bold type indicates parameter exceeds EPA water quality criteria.
[a] For the protection of human health assuming a daily ingestion of 2 liters of water, 1980.
[b] Toxicity criteria.
[c] Carcinogenicity criteria at the 10^{-5} risk level.
[d] Criteria applies to total trivalent arsenic.

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Table 12
RESIDENTIAL WELL WATER SAMPING ANALYSIS
ORGANICS (ppb)
ISBH SAMPLING 3/5/81[a]

Parameter	Dectection Limit
Pyridine	< 1,000
Cresol	< 200
Heptaclor	< 0.02
Chloridane	< 0.24
Toluene	< 3
MIBK	< 12
Methyl ethyl ketone	< 26
Malathion	< 1.1
O-xylene	< 3
Benzene	< 3
1,1 dichloroethane	< 1
1,2 dichloroethene	< 1
trichlorofluoromethane	< 1
dichlorodifluoromethane	ND
tetrachloroethene	< 1
trichloroethene	< 1
vinyl chloride	ND
strobane	< 1
diazinon	< 0.3
dimethyl phenanthrene	< 500
trimethyl phenanthrene	< 500
PCB arachlor 1016	< 0.5
PCB arachlor 1242	< 0.5
PCB arachlor 1254	< 0.5
PCB arachlor 1260	< 0.5

ND = Not detected.
[a] All nine residential well samples were reported to be below the detection limits for the parameters listed above.

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SOIL

SAMPLING AND TESTING

Sampling and testing of soil at ECC has been limited to one sample obtained by ISBH on March 2, 1979, from the dike between the cooling water pond and the unnamed ditch. Documentation of sampling and testing procedures was not found with the data.

RESULTS

Analysis of the soil sample was limited to four parameters as follows:

o	COD	30,000 ppb
o	Pb	< 1,000 ppb
o	Hg	65,000 ppb
o	Phenol	300 ppb

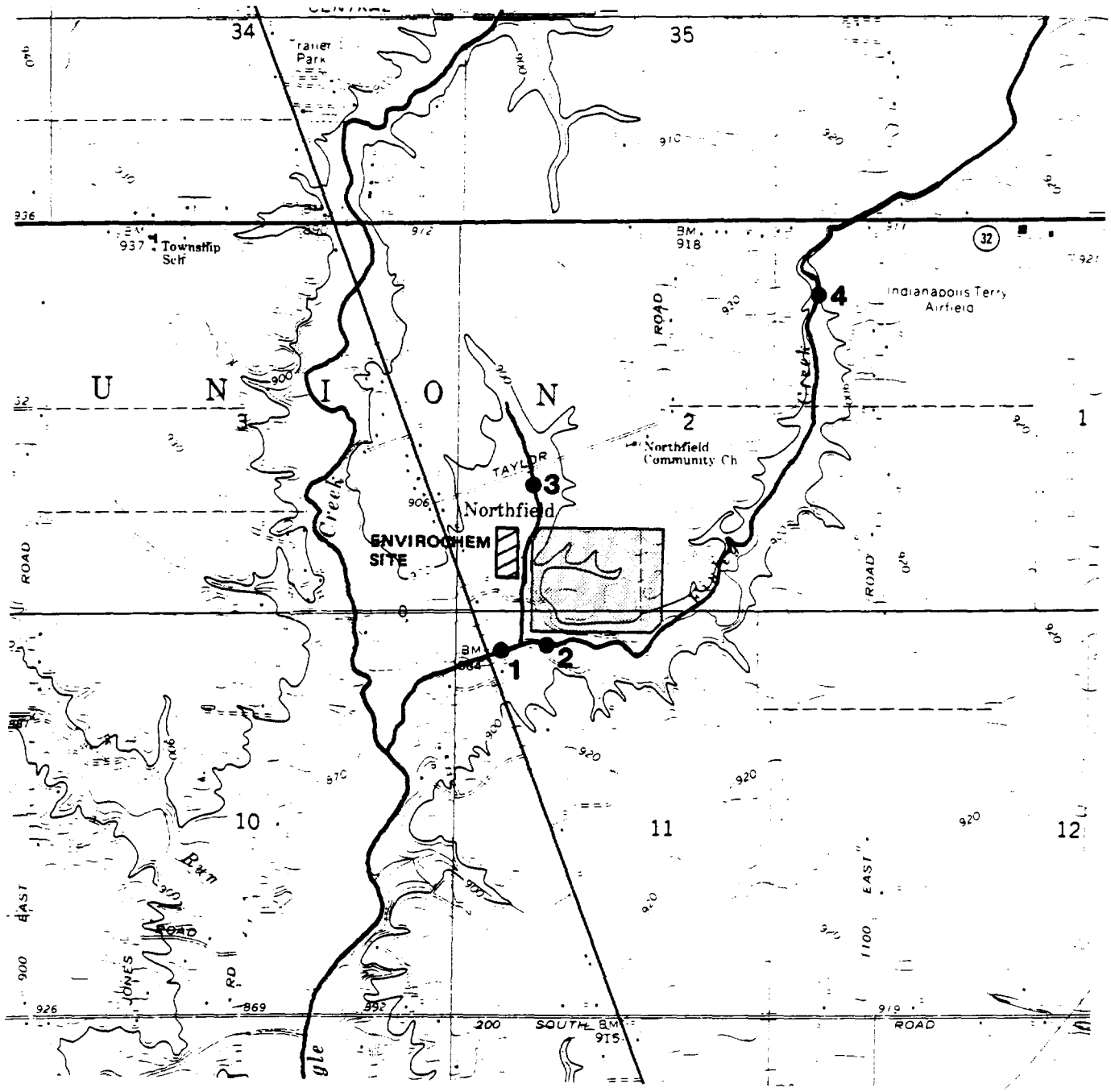
The mercury level greatly exceeds the maximum contaminant limit of 200 ppb for EP toxicity for solid wastes.

AQUATIC BIOTA

SAMPLING AND TESTING

Two studies, a bioaccumulation study on freshwater mussels and a biological assessment of stream ecosystems, have been performed in the vicinity of ECC. In the first study, the ISBH suspended live freshwater mussels, (Lampsilis radiata siluoides) in wire baskets at four locations on April 24, 1981, (Figure 4). On June 9, 1981 the mussels were taken out of the streams wrapped in solvent-rinsed aluminum foil, and kept frozen until analyzed. Each sample consisted of five mussels.

The second study was performed by members of the Department of Zoology, Depauw University, from 1978 to 1980 as part of a larger biological monitoring program. It included assessment of fish populations and benthic macroinvertebrates. One of the watersheds studied was the Eagle Creek watershed, including Finley Creek. Figure 5 shows the locations of sample stations. Fish were collected using an electric seine. After being stunned, they were placed in live nets for later identification. Three passes were made in each stream stretch. Benthic macroinvertebrates were collected with a square foot Surber sampler and a long handled dip net. Three replicates were collected at each station with each sampling device. Sampling normally took place once a month in May, June, July, August and October in 1978, 1979 and 1980. More complete



LEGEND

NORTHSIDE LANDFILL

SITE

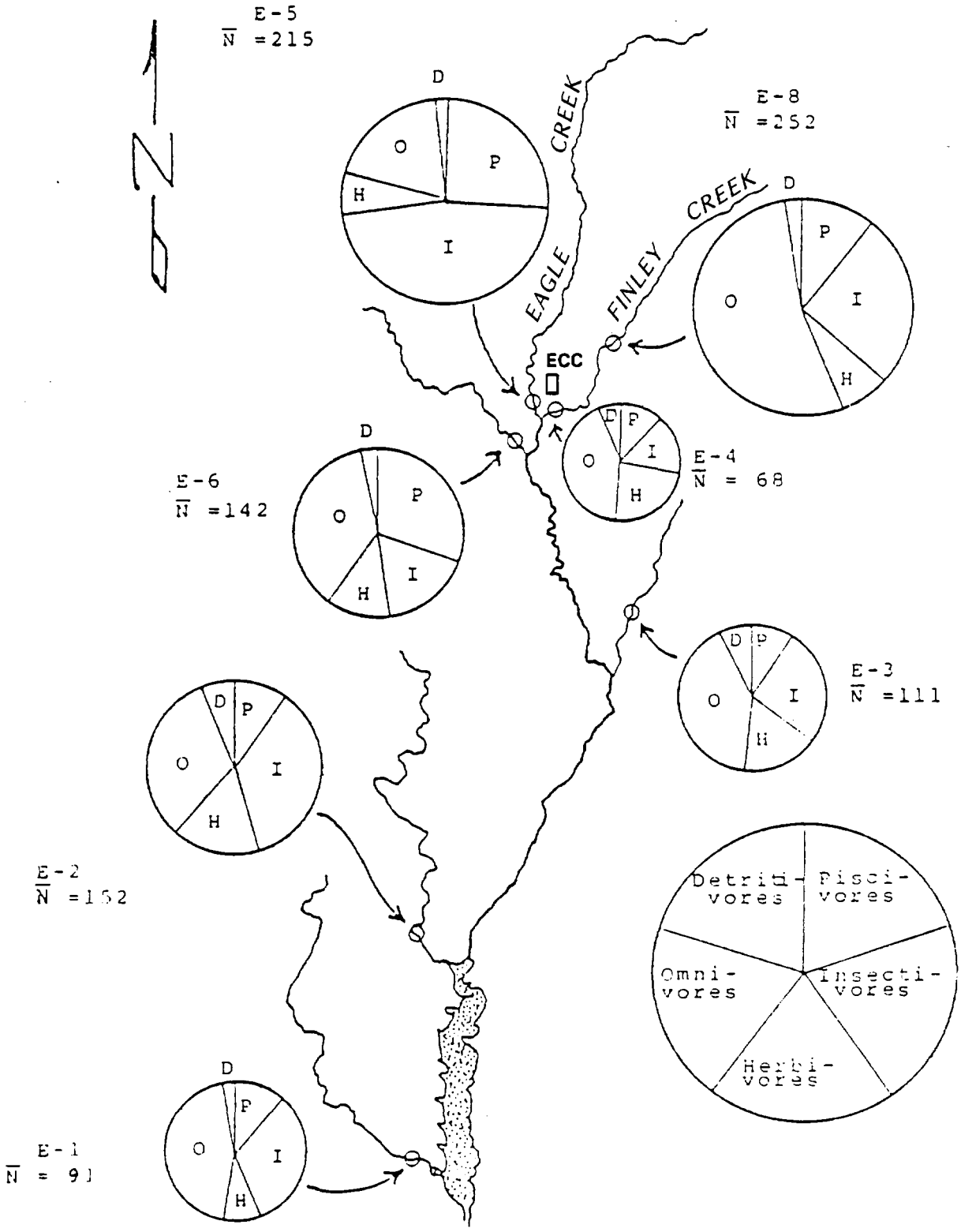
N

0 4000

2000

SCALE IN FEET

FIGURE 4
MUSSEL BIOACCUMULATION STUDY SITES
ECC SITE



Trophic composition (weight) of the fish communities of Eagle Creek tributaries during 1978-80. Mean standing crop (N) in kilograms per hectare.

SOURCE: The Biological Monitoring Program of the Indiana MIP.
J.R. Gammon, M.D. Johnson, C.E. Mays, and D.A. Schiappa.
Department of Zoology, Depauw University.

FIGURE 5
FISH POPULATION ASSESSMENT
ECC SITE

sampling method descriptions are available in the report, "The Biological Monitoring Program of the Indiana MIP," by J.R. Gammon, M.D. Johnson, C.E. Mays and D.A. Schiappa.

RESULTS

Analytical results from the mussel bioaccumulation study are presented in Table 13. The only parameter to be reported at levels higher downstream than upstream of ECC was arsenic.

Results of the Biological Monitoring Program assessment of fish population are shown in Figure 5. The mean standing crop of fish is much less at downstream station E4, compared to upstream station E8. Data on macroinvertebrates presented in the report is limited to a ranking of sample stations according to density, biomass or number of families (Table 14). Station E4 consistently ranked low in each category.

Table 13
FRESHWATER MUSSEL
BIOACCUMULATION STUDY (ppb)
ECC SITE

PARAMETER	SAMPLE LOCATION DOWNSTREAM OF ECC		SAMPLE LOCATIONS UPSTREAM OF ECC						FDA ACTION LEVEL[b]
	1A	1B	2A	2B	3A	3B	4A	4B	
Fat (%)	51	51	58	60	41	57	87	98	
Arsenic	740	750	480	560	540	620	500	580	
Cadmium	300	340	260	320	320	300	220	280	
Chromium	400	400	< 200	600	400	200	300	1,000	
Copper	1,400	1,100	1,400	1,100	800	1,000	800	1,200	
Lead	< 800	< 800	< 800	< 800	< 800	< 800	< 800	< 800	
Mercury	< 30	< 30	< 300	< 200	< 300	< 200	< 300	< 200	1,000
Silver	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	
Aldrin	ND	ND	ND	ND	ND	ND	ND	ND	
Dleldrin	LOST[a]	7	4	5	1	2	2	5	300
Chlordane	LOST[a]	7	5	5	17	18	6	6	300
DDT	ND	ND	ND	ND	ND	ND	ND	ND	
Heptachlor	ND	ND	ND	ND	ND	ND	ND	ND	
Diazinon	ND	ND	ND	ND	ND	ND	ND	ND	
Strobane	ND	ND	ND	ND	ND	ND	ND	ND	
Malathion	ND	ND	ND	ND	ND	ND	ND	ND	
PCB's	ND	ND	ND	ND	ND	ND	ND	ND	

[a] Sample Lost
[b] Federal Food and Drug Administration Action Level for substances in fish and shellfish

GLT90/68

Table 14
MACROINVERTEBRATES
ECC SITE

RANK OF EAGLE CREEK STREAMS[a]

Stream Mean Pool Depth	Fish (Composite Index)	Bivalvia (Density)	Tipulidae (Biomass)	Ephemeroptera (# of Families)	Baetidae (Density)
1. Mounts Run - E6	1. E5	1. E5	1. E5	1. E5	1. E5
2. Eagle (upper) - E5	2. E6	2. E2	2. E3	2. E6	2. E6
3. Fishback - E2	3. E2	3. E3	3. E2	3. E7	3. E7
4. Eagle (lower) - E7[b]	4. E3	4. E7	4. E6	4. E2	4. E2
5. Little Eagle - E3	5. E1	5. E6	5. E7	5. E3	5. E3
6. Finley - E4	6. E4	6. E4	6. E1	6. E4	6. E4
7. School Branch - E1	7.	7. E1	7. E4	7. E1	7. E1

[a] Invertebrates from Surber only.
[b] No fish samples taken.

Source:
The Biological Monitoring Program of the Indiana MIP. J.R. Gammon, M.D. Johnson, C.E. Mays and D.A. Schiappa. Department of Zoology, Depauw University.

GLT90/69

SUBTASK 2-2

SUBTASK 2-2 - SITE SAFETY FACILITIES

The original work plan (dated April 15, 1983), anticipated the need for a trailer onsite or near the site. The trailer was intended to serve as a decontamination facility and office trailer. However, since much of the field work at the ECC site to date has taken place outside of the actual hazardous waste site, a decontamination trailer was not required. In addition, after reviewing the estimated needs for forthcoming remedial investigation activities and future feasibility study work, it has been determined that no trailer will be required. Thus, work plan Subtask 2-2, Site Safety Facilities, has not been completed and will not be completed.

GLT424/37

SUBTASK 2-3

SUBTASK 2-3 - PREPARE SITE HEALTH AND SAFETY ASSESSMENT

The objective of a health and safety site assessment is to determine if there are portions of the site that present either potentially hazardous chemical exposure levels in the air or dangerous physical features. To accomplish this objective, available file information describing the ECC site and its contents were reviewed. A site visit and a site inspection team were then organized and the site was inspected on May 16, 1983. A copy of the site visit memorandum is included in this report.

Following the site inspection, Ecology and Environment, Inc., reviewed the RAMP site visit site safety plan and updated it based on the May 16, 1983, site visit. A copy of the updated site safety plan is presented. Included in this plan is an assessment of the health and safety hazards for the site.

GLT424/38

CH2M HILL

MEMORANDUM

TO: File

FROM: Gerald L. Bills

DATE: June 14, 1983

RE: Site Visit on May 16, 1983 (transcribed from tape)

JOB NO: W65230.C2

At the site from CH2M HILL were Jerry Bills, Phil Smith, Dennis Totzke, Tom Gilgenbach, and Randy Weltzin, and from E&E, Pete Gorton. Going on the site were myself and Pete Gorton at 3:50 p.m. eastern standard time. Pete and I were in Level C with GMH respirators on, monitoring with HNU continuously. Tom Gilgenbach served as site safety officer at the hot line with an SCBA. Background readings with the HNU ranged from .1 to .2 ppm. At the gate, the HNU reading was background. At the solidification pit, the HNU reading was still background. (Readings taken from the top of the ridge.)

Picture No. 1 is of the solidification pit looking in an easterly direction. Picture No. 2 is of the site from the northwest corner looking to the southeast. No. 3 is the same thing. Picture No. 4 is about in the middle of the north side of the site showing the drums that were partially covered with water and indicating the condition of the drums. There are visible pools of water around the drums. Standing here on the north side of the site, I can hear several drums going "boom," probably in reaction to the warming of the solvents inside. Here we are on the northeast corner of the site walking down to take picture No. 5 of some drums that were under water last winter and early spring.

It looks contaminated. Looks like there is part of a drum at this one edge, see it. Photo No. 6 is from the northeast corner of the site looking more or less to the south. HNU reading is background. These drums don't look bad, but they may be questionable. They are tilted quite a bit. Photo No. 7 is from the northeast corner looking south to a pool of water. I don't know how deep this standing water is. It looks like some drums might have been taken out of this pool of water. Picture No. 8 is looking to the south from the northeast corner. The east side of the site has drums packed up to three high and many of them have tipped over or are tilting. Some are laying on their sides. There is puddled water. The ground is visibly stained. I'll take a picture here to illustrate that fact. This will be picture No. 9.

Storage tanks are in the middle of the drum area. There is one big storage tank in here. There is drainage coming from this ponded water that I took at picture No. 9 into the cooling water pond. I am going to take a picture of this. There is also a temporary berm stopping the water. Photos Nos. 10 and 11 show the drainage into the cooling water pond. HNU reading at this point is 3 ppm. The water on the side of the site is draining out of the berm they put up. We'll take a picture of it (Photo No. 12).

In the area of the solidification pit, the HNU reading is just about 1 ppm, slightly above background. It's starting to rise between 1 and 2. Picture No. 13 is water leaking out of the solidification pit area. There is a drum leaking, this is picture No. 14. I just took a picture of a drum that says Hazardous Waste Corrosive something from Western Electric. It's leaking at the seams, certainly is corrosive. Some organic vapors just south of the process building. I took a reading in there and it's just above 1.

We're looking at the topography here, the way the ground's been torn up on the south side of the cooling pond. It looks like it would be difficult if not impossible for drainage to reach the cooling pond. The south side drum storage is possibly not draining into the cooling water pond at all. They even have a load of sandbags holding another ponded area. I'll take a picture of this. This will be picture No. 15, looking to the east on the north side of the south side drum storage area.

Picture No. 16 is of the south drum storage area on the east side taken from the cooling water pond area. Drums are stacked four high, lots of ponded water in here, about 1/3 of the way up the drums. I'll take a picture of that; that would be picture No. 17. Bulging drums - quite a nice little site here. Pete says that in the drum area that we should go in there in splash protection, especially the way we hear the drums popping. Just walking along or around the site would probably be Level C, but if you're in with the drums, use Level B.

Leaving the site at 4:35 p.m.; background readings.

GLT412/23

ECOLOGY AND ENVIRONMENT, INC.
R.E.M. FIELD INVESTIGATION TEAM
SITE SAFETY PLAN

CH764-2

A. GENERAL INFORMATION

SITE: Envirochem Corp. CH_2M HILL No: W65230.C2
WSTS No: _____

LOCATION: Zionsville, Indiana (U. S. Route 421)
PLAN PREPARED BY: N. Aungst/P. Gorton DATE: 6/15/83
APPROVED BY: _____ DATE: 6/21/83
OBJECTIVE(S): Remedial activity consisting of collection of soil samples before and after drum removal; collect water samples of the cooling water pond; and survey off-site at the fence line.
PROPOSED DATE OF INVESTIGATION: July 25 - August 6, 1983
BACKGROUND REVIEW: Complete: ____ Preliminary: X
DOCUMENTATION/SUMMARY: OVERALL HAZARD: Serious: ____ Moderate: ____
Low: ____ Unknown: ____

B. SITE/WASTE CHARACTERISTICS

WASTE TYPE(S): Liquid X Solid X Sludge X Gas ____
CHARACTERISTIC(S): Corrosive X Ignitable X Radioactive ____
Volatile X Toxic X Reactive X Unknown X Other (Name) Fungi (unknown)

FACILITY DESCRIPTION: Waste storage and recycling of solvents and oils from various industrial sources. Presently on-site, 21,000 drums, bulk tanks with 400,000 gal. capacity and cooling water pond.

Principal Disposal Method (type and location): Waste storage in drums, tanks, and pond and solidification pit.

Unusual Features (dike integrity, power lines, terrain, etc.) ____
Insufficient freeboard in the cooling water pond. Site has standing water in and around the north and south drum storage area.
Status: (active, inactive, unknown) Inactive
History: (Worker or non-worker injury; complaints from public; previous agency action): Facility operated from 9/77 to 5/82. Onsite cooling water pond of 1 x 10^6 gal. has overflowed into Eagle Creek leading to a reservoir for drinking water. Groundwater contamination with 1,1,1 - TCE, 1,2, dichloroethane, and PCB's has been reported. EPA and TAT conducted a site inspection 9/82. During this inspection, odors were detected eminating from the cooling water pond. CH2M Hill RAMP visit during May 1983.

C. HAZARD EVALUATION

SEE ATTACHMENT "A"

D. SITE SAFETY WORK PLAN

PERIMETER ESTABLISHMENT: Map/Sketch Attached Yes Site Secured: Yes
Perimeter Identified? Yes Zone(s) of Contamination Identified? No

PERSONAL PROTECTION
Level of Protection: A ___ B X C X D ___
Modifications:

SEE ATTACHMENT "B"

Surveillance Equipment and Materials:
Level B attire will include: SCBA, hardhat, acid suits or "polycoated" Tyveks, Neoprene/Butyl gloves over surgeons gloves, Neoprene work boots, boot covers, and work gloves (if necessary).

Level C attire will include all of the above with the exception of full faced air purifying respirator with GMC-H cartridges in place of the SCBA. Level C will be worn by all support staff during decontamination procedures for sampling equipment.

Surveillance Equipment is to include: OVA and/or HNU operated in the continuous mode, O_2 Meter, Explosimeter, wind direction indicator, and rad. mini. Appropriate Draeger Tubes and/or a suitable cyanide detector (monitox).

DECONTAMINATION PROCEDURES: gloves, boots, booties, outergarments, and other such equipment which have come into contact with potentially contaminated materials are to be thoroughly washed with detergent and rinsed at the hotline. The disposables, including respirator cartridges, are to be properly bagged, labelled, drummed, and left on site.

Special Equipment, Facilities, or Procedures
Detergent, rinse water, wash tubs, brushes, trash container for disposables, equipment drop, plastic sheeting, plastic bags, and safety ropes for sampling of the cooling water pond.

SITE ENTRY PROCEDURES: Enter the site fully dressed in Level "B" from an upwind direction, maintain contamination avoidance techniques. For off-site perimeter surveying, approach from an upwind direction in level "C" with continuous air monitoring.

Team Member	Responsibility
Dennis Totzke - CH_2M Hill	Team Leader
Tom Gilgenbach - CH_2M Hill	Field Assistant
Phil Smith - CH_2M Hill	" "
Gerald Bills - " "	" "
E & E employee	OVA/HNU operator

WORK LIMITATIONS (Time of day, etc.): Daylight hours; prior to site entry emergency routes and telephone numbers should be included in this plan and discussed with all team members. Daily safety meetings are to be conducted to discuss daily work activities and potential heat stress reduction and monitoring techniques.

INVESTIGATION-DERIVED MATERIAL DISPOSAL:
Will be properly bagged, labelled, and disposed of on site. This will include boot covers, gloves, and disposable coveralls.

*E. EMERGENCY INFORMATION

LOCAL RESOURCES

Ambulance _____
Hospital Emergency Room _____
Poison Control Center _____
Police _____
Fire Department _____
Airport _____
Explosives Unit _____
EPA Contact _____

SITE RESOURCES

Water Supply _____
Telephone _____
Radio _____
Other _____

EMERGENCY CONTACTS

1.	Dr. Raymond Harbison (University of Arkansas)	(501) 661-5766 or 661-5767 (501) 370-8263 (24 hour)
2.	Safety Coordinator/D. Dahlstrom	(716) 632-4491 (Office) (716) 741-2384 (Home)
3.	RPT Leader	
4.	RPT Office	
5.	Ecology and Environment, Inc. NPMO . . .	(703) 522-6065
6.	Regional Health Maintenance Program Contact	
7.	Emergency Paging System	(716) 882-2804
8.		
9.		
10.		

* TO BE SUPPLIED BY THE TEAM LEADER PRIOR TO THE INITIATION OF ANY SITE ACTIVITIES

* F. EMERGENCY ROUTES

(Give road or other directions; attach map)

HOSPITAL: _____

OTHER: _____

C. HAZARD EVALUATION

Health hazards on the site exist from the inhalation, ingestion, and skin contact from the wastes known to be onsite; including: cyanides, heavy metals, chlorinated solvents, polynuclear aromatic hydrocarbons, phenols, waste oils, and other chemical miscellany. It is imperative that all on-site personnel be properly informed as to these hazards; that they receive sufficient training in the use and limitations of all required protective equipment including both dermal and respiratory; that all be given ample opportunity to wear the respiratory equipment and become acclimated to it prior to any on-site activities; and that all receive prior written approval by a physician to wear the respiratory equipment under the conditions representative of on-site activity. Other potential health hazards exist due to the various fatique factors associated with wearing protective equipment, the work being done on the site, the extended work schedule of ten (10) hour days.

Heat stress, fatique, cramps, or exhaustion may also become a factor of personnel safety. All personnel should be made aware of physical signs, symptoms, and treatment techniques associated with each of these conditions. Work schedules may need to be adjusted accordingly if the factors of heat stress become apparent. All personnel should be encouraged to increase their intake of water during breaks and should avoid the intake of diuretics such as coffee, tea, colas, or other caffinated liquids. The use of salt tablets is not encouraged.

The entire site should be considered hazardous. Specific hazardous areas on-site include:

1. the cooling water pond and surrounding area;

2. the solidification pit;

3. areas of pooled standing water in the vicinity of stacked drums;

4. areas where drums are stacked three and four high;

5. onsite buildings; and

6. areas where cleanup and drum removal has taken place.

Strict contamination avoidance practices should be adhered to at all times. Sampling of the cooling water pond will require the additional use of safety lines to prevent falls into the cooling water pond.

ATTACHMENT B

PERSONAL PROTECTION

Level B when sampling within the site perimeter. This level may be modified only in the case where no on-site cleanup activities are occurring and the ambient contaminant concentrations can be demonstrated to be consistently below 5 ppm above background via continuous monitoring with the OVA; the air contaminants are known; there is an "approved" cartridge available; and the personnel have been properly fit tested in the air purifying respirators.

Level C protection will be used for off-site perimeter surveying. If any concurrent on-site cleanup activity is in progress during the off-site surveying, modification will be required for this safety plan. This may include Level B when off-site and downwind of the cleanup activity.

SUBTASK 2-4

SUBTASK 2-4 - SITE MAPPING

Specifications describing the surveying, aerial photography and photogrammetric services required for the ECC site were prepared and sent to five potential subcontractors on April 1, 1983. Four potential subcontractors responded and, after a review of the various proposals, costs and technical qualifications, the subcontract was awarded to Kucera and Associates, Inc., on May 5, 1983, for $2,740.00.

The subcontractor photographed the site on May 5, 1983, and conducted the ground control surveying on May 14, 1983. The completed photogrammetric map, a set of contact prints and the surveying control log were submitted to CH2M HILL on June 17, 1983. A copy of the aerial map and surveying control report are included with this report.

GLT424/39

ENVIRONMENTAL CHEMICAL AND CONSERVATION CORPORATION SITE

ZIONSVILLE, INDIANA

PROJECT # W65230.C2

CONTROL REPORT

PREPARED BY

KUCERA
& ASSOCIATES, INC.
Photogrammetric Consultants
Mentor, Ohio
Lakeland, Fla. Denver, Col.
Atlanta, Ga.

FIELD NOTES

JOB NAME KUCERA - ENVIRO-CHEM
P.D. Nº 0233122, 14 K.S.
FILE Nº 061802O102.30
DATE 5/14/83 TO 5/21/83

CREW #1
PARTY CHIEF C.A.B.
INST. MAN J.M.B.
ROD MAN C.O.

IF FOUND PLEASE RETURN TO

C.A. Budnick, Surveyor
6030 Harbour Town Court
Noblesville, IN 46060

—— INDEX ——

I HEREBY CERTIFY THAT THIS SURVEY WAS CONDUCTED UNDER MY DIRECT SUPERVISION.

5/21/83

C. G. R[illegible], L.S.

IND. REG. # 11604

POINT NUMBER INVENTORY

	0	1	2	3	4	5	6	7	8	9
0		X	X	X	X	X	X	X	X	X
1	X	X	X	X						
2		X	X	X	X	X	X	X	X	X
3	X	X	X	X	X					
4										
5										
6										
7										
8										
9										

	0	1	2	3	4	5	6	7	8	9
10										
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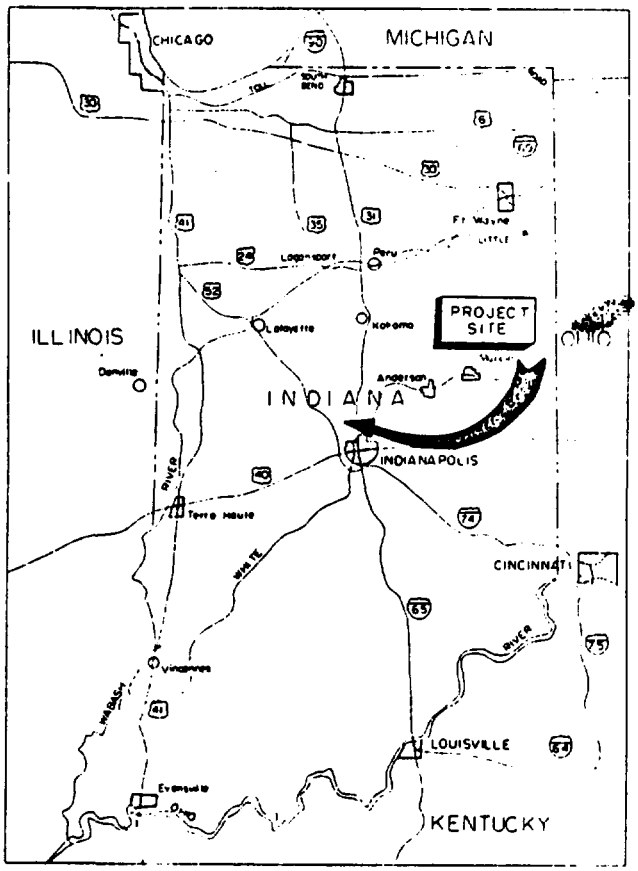
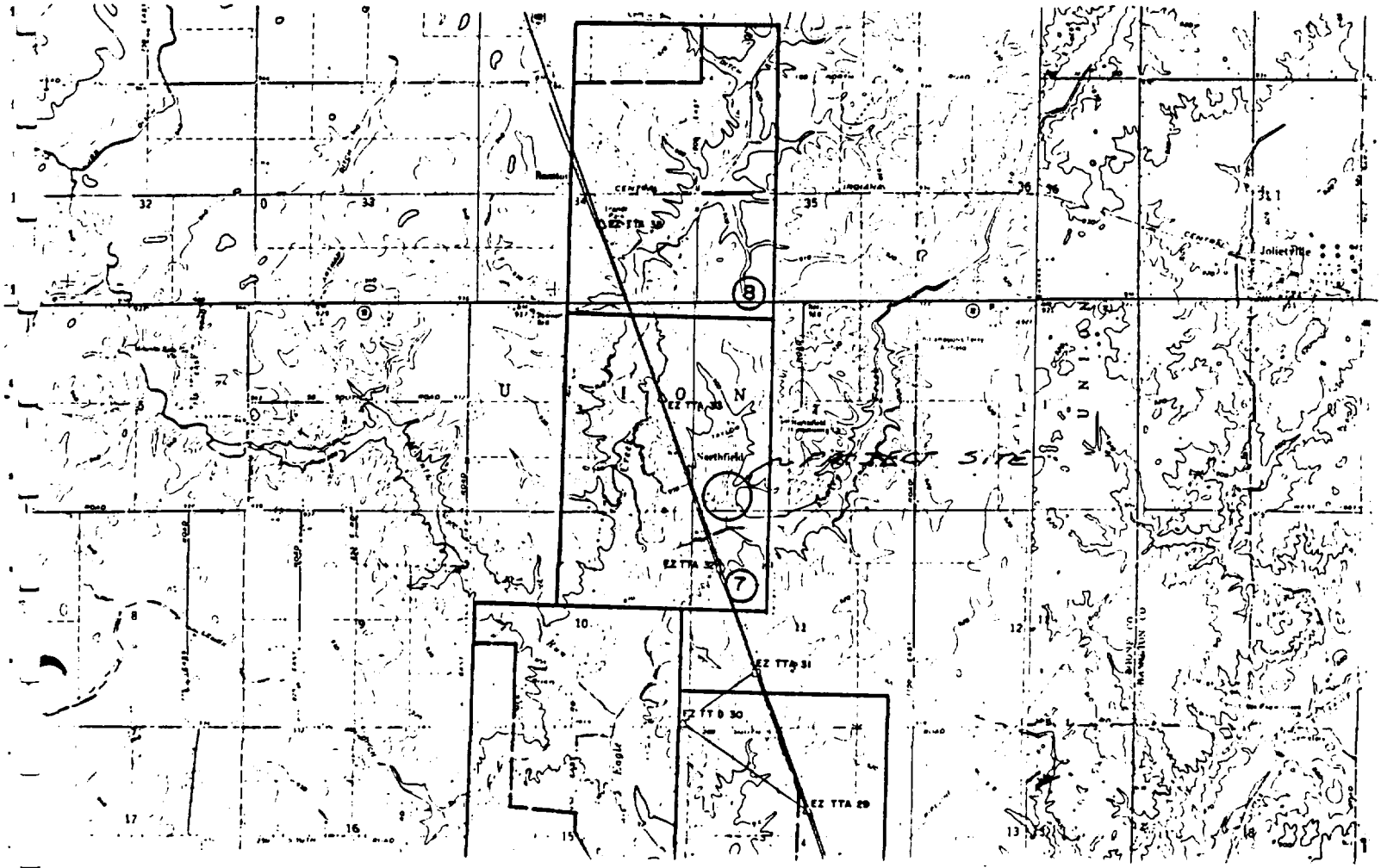
17										
18										
19										

X= FIELD POINT C= COMPUTED POINT


CHICAGO
MICHIGAN
ILLINOIS
INDIANA
PROJECT SITE
INDIANAPOLIS
Terre Haute
CINCINNATI
LOUISVILLE
KENTUCKY
WABASH RIVER
WHITE RIVER


PROJECT SITE
Northfield
Joliet
EZ TTA 35
EZ TTA 31
EZ TTA 30
EZ TTA 29

HORIZONTAL CONTROL POSITIONS

Project or stream: EAGLE CREEK County: BOONE Name and no. of station: EZTTA 32

State or geographic index of quadrangle: N 4000 – W 8615/7.5 Name of quadrangle: ROSSTON

Date established [redacted]: 1977 Elevation of station:

Agency by whom established or recovered: ROBERT SCHERSCHEL CO., INC., INDIANAPOLIS, INDIANA

Adjusted on Horizontal N. A. Datum, 1927: Yes [X] No [ ] Other datum:

Adjusted on Vertical M. S. L. Datum, 1929: Yes [ ] No [ ] Other datum:

Latitude: 40 ° 01 ' 20.8632 " Longitude: 86 ° 16 ' 35.2620 "

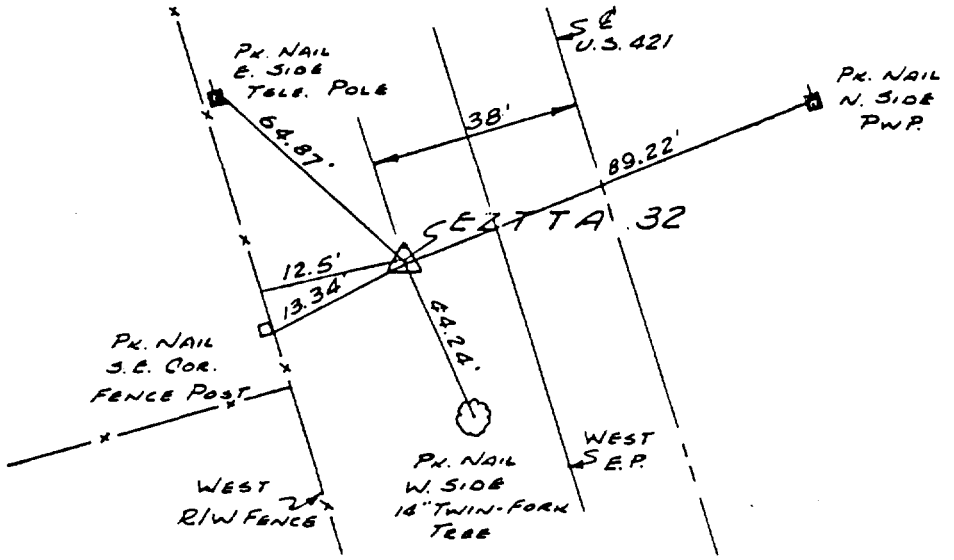
To Station	Azimuth*	Grid Azimuth	Distance In Feet
EZTTA 33	160°24'56.1017"	159°53'48.1000"	4517.0166

State Grid Coordinates: Zone WEST X 725,981.2191 Y 919,676.3354

DESCRIPTION OF MONUMENT AND BASE, ROUTE TO STATION AND REFERENCE MARKS

IN THE NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 18 NORTH, RANGE 2 EAST, LOCATED 1.33 MILES SOUTHEAST OF THE JUNCTION OF S.R. #32 AND U.S. #421 ON U.S. #421. THE STATION IS SET IN THE WEST R/W 12.5' EAST OF THE R/W FENCE AND 38' WEST OF THE CENTERLINE OF U.S. #421. STATION IS 100' ± NORTH OF THE CREST OF A HILL ON U.S. #421. A STONE HOUSE IS LOCATED 600 ± NORTH 55° EAST (MAGNETIC). SET FLUSH WITH THE GROUND, IT IS A STANDARD D.N.R. BRASS TABLET SET IN A 10" CONCRETE MONUMENT STAMPED "EZTTA 32".

SKETCH MAP OR PHOTOGRAPH OF STATION



* True direction reckoned clockwise from true south.

Date .....

INDIANA FLOOD CONTROL AND WATER RESOURCES COMMISSION

HORIZONTAL CONTROL POSITIONS

Project or stream: EAGLE CREEK County: BOONE Name and no. of station: EZTTA 33

State or geographic index of quadrangle: N 4000 - W 8615/7.5 Name of quadrangle: ROSSTON

Date established [redacted]: 1977 Elevation of station: 913.773**

Agency by whom established or recovered: ROBERT SCHERSCHEL CO., INC., INDIANAPOLIS, INDIANA

Adjusted on Horizontal N. A. Datum, 1927: Yes [X] No [ ] Other datum:

Adjusted on Vertical M. S. L. Datum, 1929: Yes [X] No [ ] Other datum:

Latitude: 40 ° 02 ' 02.9186" Longitude: 86 ° 16 ' 54.7261"

To Station	Azimuth*	Grid Azimuth	Distance In Feet
EZTTA 32	340°24'44.0350"	339°53'48.1000"	4517.0166
EZTTA 35	159°22'32.2350"	158°51'36.3000"	4427.0532

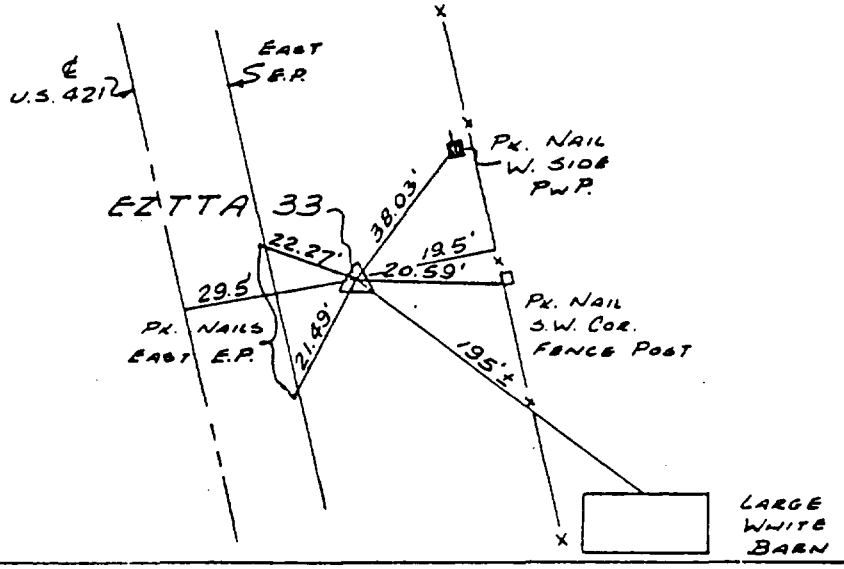
State Grid Coordinates: Zone WEST X 724,428.6561 Y 923,918.1496

DESCRIPTION OF MONUMENT AND BASE, ROUTE TO STATION AND REFERENCE MARKS

IN THE SOUTHEAST QUARTER OF SECTION 3, TOWNSHIP 18 NORTH, RANGE 2 EAST. LOCATED 0.5 MILES SOUTHEAST OF THE JUNCTION OF S.R. #32 AND U.S. #421 ON U.S. #421 AT THE TOP OF A HILL WHERE THE ROAD IS IN A CUT SECTION. THE STATION IS SET IN THE EAST R/W, 29.5' EAST OF THE CENTERLINE OF U.S. #421 AND 3' ABOVE. ALSO, IT IS EAST OF THE DITCH ON THE SIDE SLOPE OF THE HILL AND 19.5' WEST OF THE R/W FENCE. STATION IS APPROXIMATELY 195 FEET NORTH OF THE NORTH FACE OF A LARGE WHITE BARN WHICH LIES SOUTH 38° EAST (MAGNETIC). SET FLUSH WITH THE GROUND, IT IS A STANDARD D.N.R. BRASS TABLET SET IN A 10" DIAMETER CONCRETE MONUMENT STAMPED "EZTTA 33".

** ELEVATION AS ESTABLISHED BY ACCU-AIR SURVEYS

SKETCH MAP OR PHOTOGRAPH OF STATION



* True direction reckoned clockwise from true south

Date .....

LFC Form Apr

HORIZONTAL CONTROL POSITIONS

Project or stream: EAGLE CREEK County: BOONE Name and no. of station: EZTTA 35

State or geographic index of quadrangle: N 4000 – W 8615/7.5 Name of quadrangle: ROSSTON

Date established [redacted]: 1977 Elevation of station: 931.696**

Agency by whom established or recovered: ROBERT SCHERSCHEL CO., INC. INDIANAPOLIS, INDIANA

Adjusted on Horizontal N. A. Datum, 1927: Yes [X] No [ ] Other datum:

Adjusted on Vertical M. S. L. Datum, 1929: Yes [X] No [ ] Other datum:

Latitude: 40 ° 02 ' 43.8633 " Longitude: 86 ° 17 ' 14.7759 "

To Station	Azimuth*	Grid Azimuth	Distance In Feet
EZTTA 33	339°22'19.7736"	338°51'36.3000"	4427.0532
R.M. #1			74.88
R.M. #2			62.20

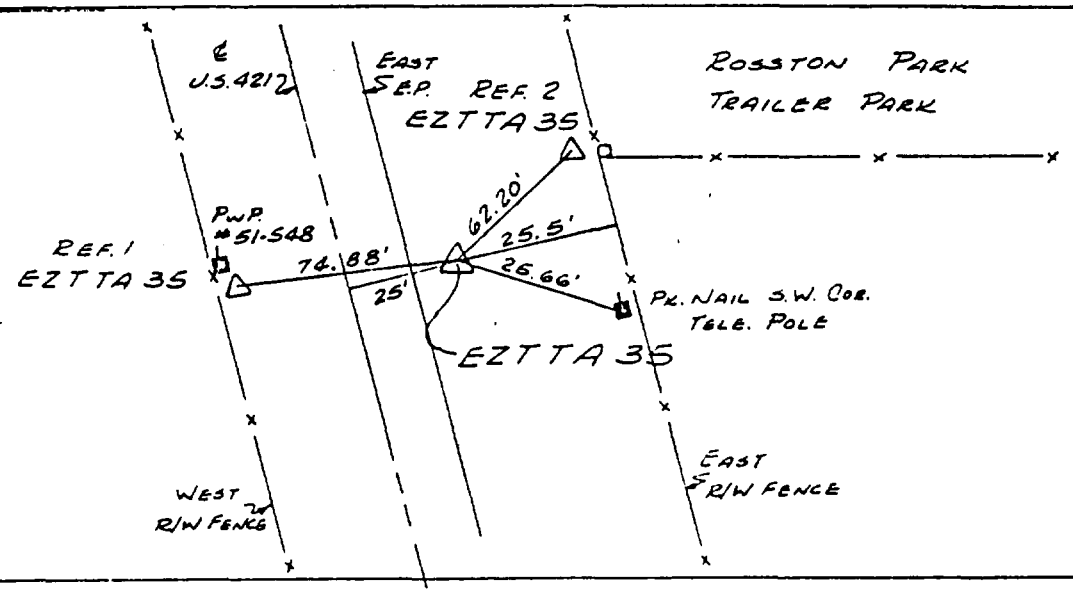
State Grid Coordinates: Zone WEST X 722,832.0529 Y 928,047.2729

DESCRIPTION OF MONUMENT AND BASE, ROUTE TO STATION AND REFERENCE MARKS

IN THE SOUTHEAST QUARTER OF SECTION 34, TOWNSHIP 19 NORTH, RANGE 2 EAST. LOCATED 0.33 MILES NORTHWEST OF THE JUNCTION OF S.R. #32 AND U.S. #421 ON U.S. #421 NEAR THE ROSSTON TRAILER PARK. THE STATION IS SET IN THE EAST R/W OF U.S. #421, 25' EAST OF THE CENTERLINE OF U.S. #421 AND 25.5' WEST OF THE R/W FENCE AND APPROXIMATELY 80 FEET SOUTHEAST FROM THE CENTERLINE OF A DRIVE INTO A GARAGE AT THE SOUTHWEST CORNER OF THE TRAILER COURT. FLUSH WITH THE GROUND IT IS A STANDARD D.N.R. TABLET SET IN A 10" DIAMETER CONCRETE MONUMENT STAMPED "EZTTA 35." REFERENCE MONUMENT #1 IS WESTERLY OF THE STATION, 4' EAST OF THE R/W FENCE AND 3' EAST OF P.W.P. #51-548. FLUSH WITH THE GROUND IT IS A STANDARD D.N.R. BRASS TABLET STAMPED "EZTTA 35 REF 1". REFERENCE MONUMENT #2 IS NORTH OF THE STATION AND 3.5' WEST OF THE CORNER OF A FENCE POST. SET FLUSH WITH THE GROUND, IT IS A STANDARD D.N.R. BRASS TABLET STAMPED "EZTTA 35 REF 2".

** ELEVATION AS ESTABLISHED BY ACCU-AIR SURVEYS

SKETCH MAP OR PHOTOGRAPH OF STATION



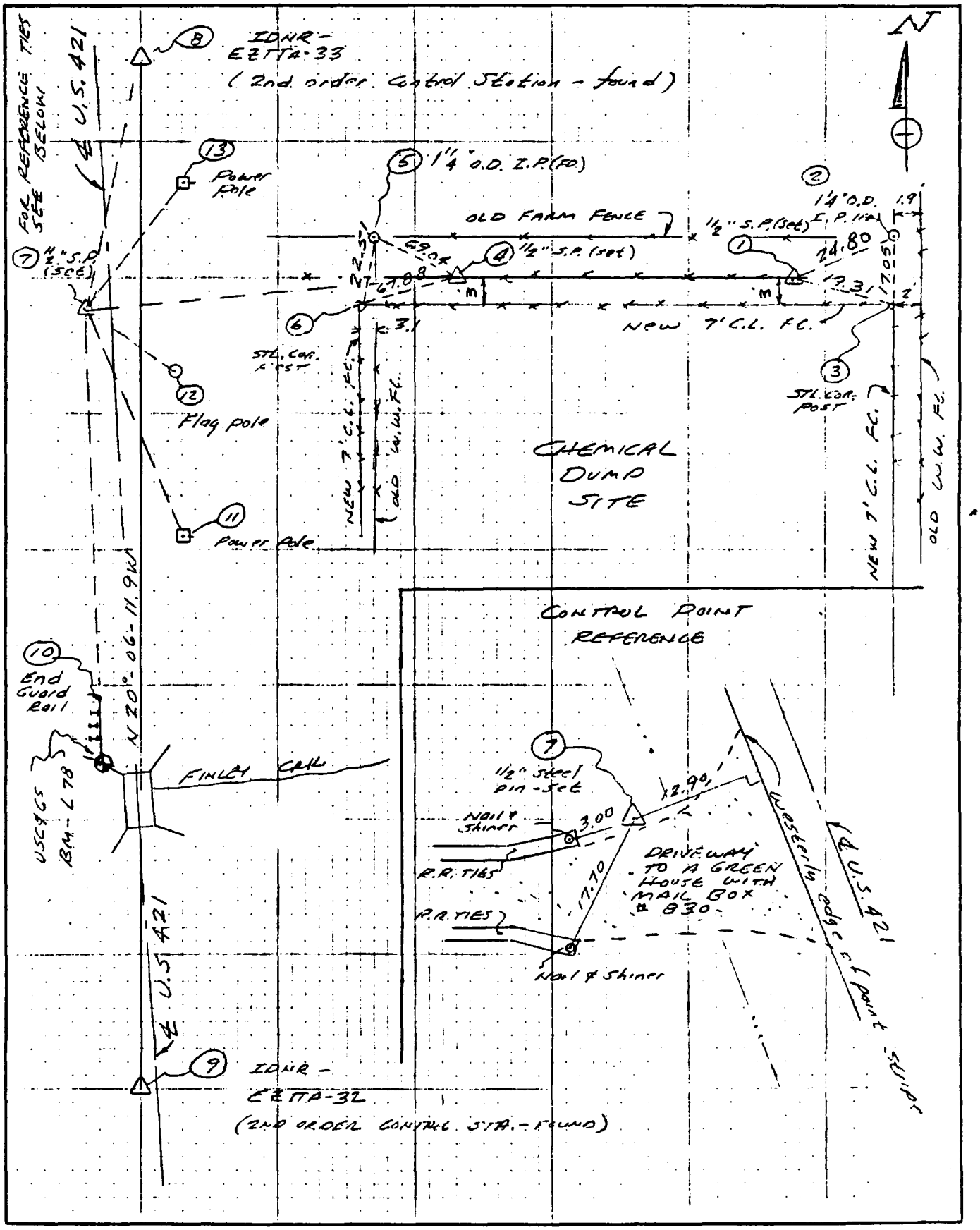
* True direction reckoned clockwise from true south.

Date .....

HORIZONTAL CONTROL DIAGRAM

C.A. Budnick, Surveyor
6030 Harbour Town Court
Noblesville, IN 46060

JOB KUCERA - ENVIRO-CHEM LINE
P.O. # 2283122.14 FILE # 061802 0102.30
SURVEYED BY CAB, JMB DATE 5/14/83
CHECKED BY DATE
COMPUTED BY CAB DATE 5/21/83
SCALE NONE SHEET # 5 OF 12



STA.	D/R	D	M	S	S	Direction & Sides	Mean Direction &
		∡ @ 1					
4	D	00	00	41	42		
	R	180	00	41	45		
2	D	142	07	12	13	142-06-20	
	R	322	06	54	50		
4	R	270	05	27	29		00-00-00
	D	90	05	53	37		
2	R	52	11	39	41	142-06-13	142-06-16.5
	D	232	11	51	47		
	CHANGED DIST.						
	Slope dist.	V.A.	Temp.				COOR. HOR. DIST.
4							4
	200.40	90-00	68°				295.97
	95.07	90-00					
1							1
		∡ @ 4					
7	D	00	00	24	26		
	R	180	00	15	16		
5	D	19	08	30	33	19-08-14.75	
	R	199	08	57	40		
1	D	182	37	18	15	182-36-48.5	
	R	02	37	02	00		
7	R	270	05	36	32		00-00-00
	D	90	05	45	45		
5	R	289	14	05	02	19-08-23.0	19-08-18.375
	D	109	14	00	03		
1	E	92	42	13	13	182-36-40.75	182-36-44.625
	P	272	42	27	28		

INSTRUMENT # TT-111630 SERIAL #

C.A. Budnick, Surveyor
6030 Harbour Town Court
Noblesville, IN 46060

JOB Kucera Enviro Chem LINE Angola 20
P.O. # 02 53122.14 FILE # 06/80 20/02.3
SURVEYED BY CAB, JMB DATE 5/14/87
CHECKED BY CAB DATE 5/21/87
SCALE SHEET # 6 OF 12

INSTRUMENT # T2 - 111650 SERIAL #

STN	DIR	D	M	S	S	Direction & Specs	Mean Direction &
		T = 5					
9	D	00	00	15	12	00 - 00 - 00	
	E	180	00	03	03		
7	D	00	55	14	13	00 - 55 - 00,5	
	E	180	55	05	03		
9	E	270	05	38	37		00 - 00 - 00
	D	90	05	40	42		
7	E	271	00	31	32	00 - 54 - 57.75	00 - 54 - 59.125
	D	91	00	42	43		
		T e 7					
8	D	00	00	01	04	00 - 00 - 00	
	R	180	00	03	05		
13	D	10	36	05	10	10 - 35 - 52.75	
	R	190	35	42	47		
4	D	103	58	24	26	103 - 58 - 27.25	
	E	283	58	34	38		
12	D	149	03	00	00	149 - 03 - 04.25	
	E	329	03	15	15		
11	D	173	48	03	02	173 - 47 - 58.5	
	E	353	48	02	00		
10	D	177	59	30	32	177 - 59 - 31.75	
	E	357	59	39	39		
8	E	270	05	40	39		00 - 00 - 00
	D	90	05	51	50		
13	E	230	41	36	34	10 - 35 - 55	10 - 35 - 53.875
	D	100	41	46	44		
4	E	14	04	13	13	103 - 58 - 32.75	103 - 58 - 30
	D	194	04	23	22		
12	E	59	08	55	57	149 - 03 - 11.75	149 - 03 - 08
	D	239	08	57	58		
11	E	33	53	40	42	173 - 48 - 06.5	173 - 48 - 02.5
	D	263	54	00	04		
10	E	88	05	15	17	177 - 59 - 36.75	177 - 59 - 34.25
	D	268	05	27	28		

T-A.	SD-FT.	SD-M	V-A	TEMP	BAR.	HORIZ. DIST.	REMARKS
7				72°	30.25"	7	
	1751.00	533.711	89-34-40			1751.035	
	1751.01	533.720	270-23-45			8	
8							
7						7	
	337.28	102.807	99-24-38			337.279	
	337.28	102.804	270-33-31			13	
13							
7						7	
	652.24	198.838	90-36-50			652.236	
	652.25	198.840	269-21-33			4	
4							
7						7	
	204.06	62.178	91-01-20			204.035	
	204.06	62.179	268-57-04			12	
12							
7						7	
	925.56	282.109	90-52-07			925.477	
	925.55	282.110	269-06-15			11	
11							
7						7	
	1442.39	439.639	90-54-11			1442.252	
	1442.38	439.642	269-04-12			10	
10							

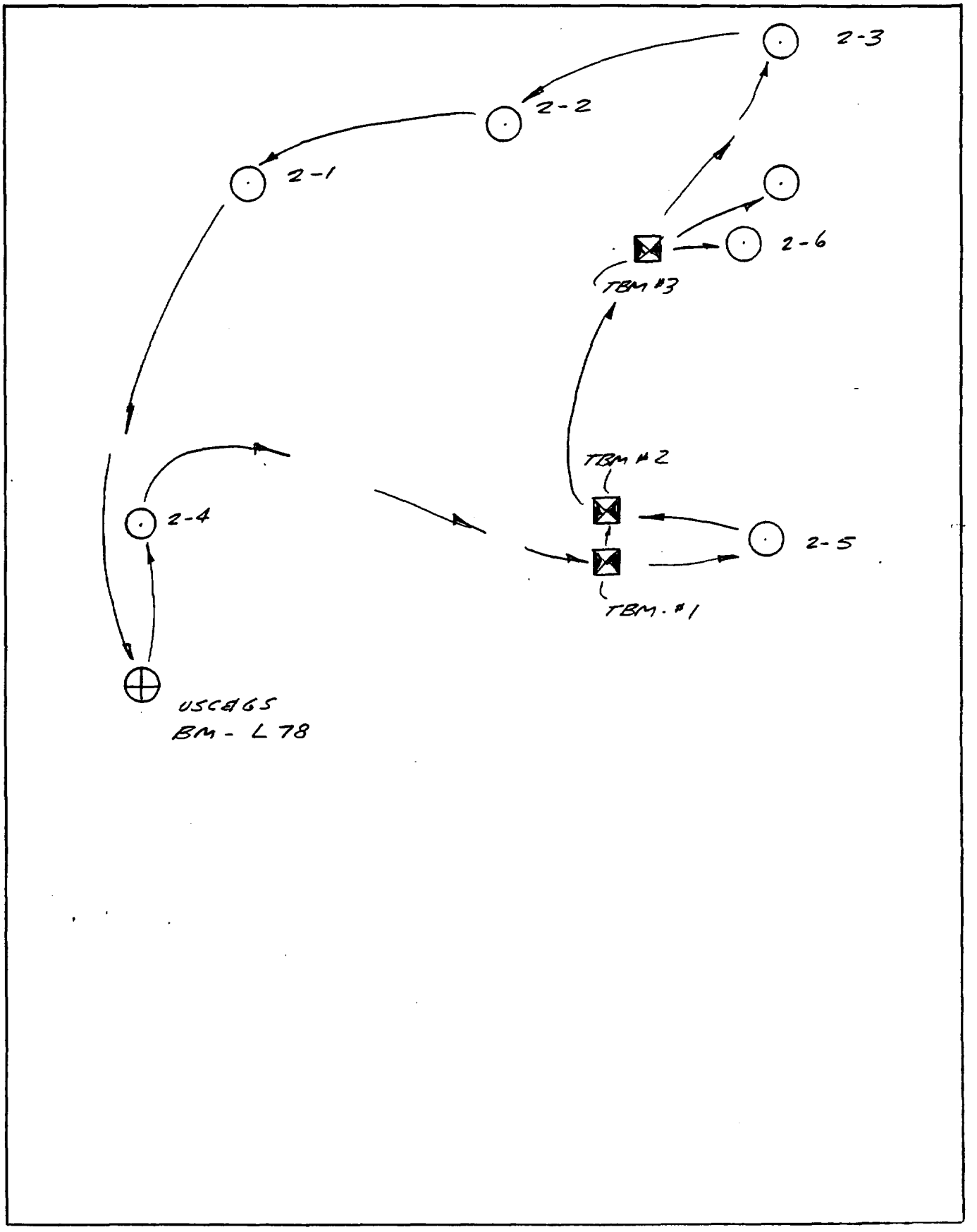
C.A. Budnick, Surveyor
6030 Harbour Town Court
Noblesville, IN 46060

JOB Kucera - Emmro Cable LINE EDM
P.O. # 02933122.14 FILE # 06180201/02.3
SURVEYED BY CAB, JMB DATE 5/19/87
CHECKED BY CAB DATE 5/21/87
SCALE _____ SHEET # 7 OF 12

INSTRUMENT # _____ SERIAL # _____

C.A. Budnick, Surveyor
6030 Harbour Town Court
Noblesville, IN 46060

JOB KUCERA - ENVIROCHEM LINE VERTICAL CONTROL DIAGRAM
P.D. # 0283122.14 FILE # 061B020102.30
SURVEYED BY CAC, JMB DATE 5/14/83
CHECKED BY _____ DATE _____
COMPUTED BY CAC DATE 5/21/83
SCALE NONE SHEET # 8 OF 12



...ENT OF COMMERCE
...D GEODETIC SURVEY
WASH...TON D.C.

Coast and Geo... Survey
SEA LEVEL DATU... 1929

PA...
ILL-IND DIA NK 16-11
LATITUDE 40°00' 40°30'
LONGITUDE 86°00' 86°30'

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 526
Ed. Feb. 1941

DESCRIPTION OF BENCH MARK

Designation of bench mark B 114 State Indiana County Boone

Nearest town Elizaville County Boone

Distance and direction from nearest town About 0.95 mile east

Detailed description of location Along State Highway 47 about 0.95 mile east of the cross roads at Elizaville, 0.1 mile west of the junction with a road leading south, set in the top of the southeast wingwall of a 15-foot concrete bridge, 16 feet south of the center line of the highway and about 1 foot lower than road level. A standard disk, stamped "B 114 1946."

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 526
Ed. Feb. 1941

DESCRIPTION OF BENCH MARK

Designation of bench mark C 114 State Indiana County Boone

Nearest town Elizaville County Boone

Distance and direction from nearest town About 1.7 mile east

Detailed description of location Along State Highway 47 about 1.7 mile east of the cross roads at Elizaville, set in the top of the east end of the north concrete headwall of a double 24-inch corrugated steel pipe culvert, 19 feet north of the center line of the highway and about 1 foot above highway level. A standard disk, stamped "C 114 1946."

Line 116.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 526
Ed. Feb. 1941

DESCRIPTION OF BENCH MARK

Designation of bench mark K 78 State Indiana County Boone

Nearest town Rosston County Boone

Distance and direction from nearest town About 2.6 miles southeast

Detailed description of location About 2.6 miles southeast along State Highway 29 from the crossing of the Central Indiana Railroad at Rosston, at a graveled cross road, 47 feet northeast of the center line of the highway, 29 feet south of the center line of the cross road, 5 feet southwest of a fence corner, 3 feet west of a fence line, 1.7 feet north of a white wooden witness post and about level with the highway. A standard disk stamped "K 78 1946" and set in the top of a concrete post projecting 5 inches above ground.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 526
Ed. Feb. 1941

DESCRIPTION OF BENCH MARK

Designation of bench mark L 78 State Indiana County Boone

Nearest town Rosston County Boone

Distance and direction from nearest town About 1.7 mile southeast

Detailed description of location About 1.7 mile southeast along State Highway 29 from the crossing of the Central Indiana Railroad at Rosston, about 1.15 mile southeast of the intersection with State Highway 32, set in the top of the west wingwall of a 48-foot concrete bridge, 14.5 feet southwest of the center line of the highway and about 1 foot above road level. A standard disk, stamped "L 78 1946."

EL. 883.653

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 526
Ed. Feb. 1941

DESCRIPTION OF BENCH MARK

Designation of bench mark K 78 State Indiana County Boone

Nearest town Rosston County Boone

Distance and direction from nearest town About 0.55 mile southeast

Detailed description of location About 0.55 mile southeast of the crossing of the Central Indiana Railroad at Rosston along State Highway 29 and at the intersection with State Highway 32, in the northeast quarter of the intersection, set in the top of the southeast end of the northeast headwall of a 10-foot concrete box culvert, 19 feet northeast of the center line of highway 29, 110 feet north of the center line of highway 32, and about level with the intersection. A standard disk, stamped "K 78 1946."

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 526
Ed. Feb. 1941

DESCRIPTION OF BENCH MARK

Designation of bench mark J 28 State Indiana County Boone

Nearest town Rosston County Boone

Distance and direction from nearest town About 0.5 mile northwest

Detailed description of location About 0.5 mile northwest along State Highway 29 from the crossing of the Central Indiana Railroad at Rosston, at a graveled cross road, 49 feet northeast of the center line of the highway, 22 feet north of the center line of the cross road, 8.5 feetnorthwest of a fence corner, 2 feet west of a fence line, 2 feet north of a white wooden witness post and about level with the highway. A standard disk, stamped "J 78 1946" and set in the top of a concrete post projecting 5 inches above ground.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 526
Ed. Feb. 1941

DESCRIPTION OF BENCH MARK

Designation of bench mark H 78 State Indiana County Boone

Nearest town Haugh County Boone

Distance and direction from nearest town About 1.05 mile southeast

Detailed description of location Along State Highway 29 about 1.05 mile southeast of the cross roads at Haugh and about 1.55 mile northwest of the crossing of the Central Indiana Railroad at Rosston, at a graveled cross road, 48 feet southwest of the center line of the highway, 16 feet south of the center line of the cross road, 5 feet southeast of a fence corner, 2 feet east of a fence line, 1½ feet north of a white wooden witness post and about 1½ feet above the level of the highway. A standard disk, stamped "H 78 1946" and set in the top of a concrete post projecting 5 inches above ground.

(6)

STA	+	HI	-	EL.	ADJ EL.		
USC&GS	1.77	885.42			883.653	USC&GS Bm. L-78 1946 STD. DISC	
Bm - 78	10.785					SET IN TOP OF N.W. WINGWALL OF	
	12.52					US 421 BRIDGE OVER FINLEY CREEK	
①	6.16	885.88	5.70	879.72			
	6.36		6.82				
	12.52		12.52				
2-4	9.69	894.59	0.93	884.90		℄ RD. - IN LINE w/ ℄ CULVERT N-3	
	2.83		11.54				
	12.52		12.52				
②	0.51	889.38	5.72	883.87			
	12.01		6.80				
	12.52		12.52				
③	3.75	883.74	9.39	879.99			
	8.77		3.13				
	12.52		12.52				
TBM#2	3.33	883.74	3.83	879.91		CHISELED "□" @ N.W. COR. OF N. HDWL. OF	
	8.69		8.69			TWIN PIPES UNDER LAND FILL HAUL ROAD	
	12.52		12.52				
TBM#1	9.12	883.67	4.19	879.55		CHISELED "□" @ S.E. COR. OF S. HDWL. OF	
	3.39		8.33			TWIN PIPES UNDER LAND FILL HAUL ROAD	
	12.51		12.52				
2-5			1.48	881.20		℄ RD. INTERSECTION	
			11.04				
			12.52				
TBM#2	6.43	886.34	8.76	879.91			
	6.09		3.75				
	12.52		12.51				
④	5.63	890.97	1.00	885.34			
	6.39		11.52				
	12.52		12.52				

INSTRUMENT # WILD N-2 SERIAL #

C.A. Budnick, Surveyor
6030 Harbour Town Court
Noblesville, IN 46060

JOB Kuchua-Enviro Chem LINE Bench Levels
P.O. # 02831122.14 FILE # 061802012.5
SURVEYED BY CAB, CD DATE 5/15/93
COMPUTED
CHECKED BY CAB DATE 5/21/93
SCALE SHEET # 10 OF 12

INSTRUMENT #_____ SERIAL #_____

	+	-F	−	EL.	MON EL.		
TBM #3	5.17	890.30	4.14	886.33		NAIL & RIBBON IN TOP OF STUMP ON E SIDE	
	3.55		8.38			OF STREAM NEAR FALLEN LOG	
	12.52		12.52				
TBM #3	6.43	893.26	3.97	886.93	886.92		
	6.10		8.55				
	12.53		12.52				
2-6			5.54	887.72		2' EAST OF E EDGE OF TIRE	
			6.98				
			12.52				
2-7			0.93	892.33		CENTER OF "U" SHAPED PATTERN	
			11.59				
			12.52				
⊖	9.39	896.48	6.17	887.09			
	3.13		6.36				
	12.52		12.53				
⊙	4.82	899.92	1.38	895.10			
	7.70		11.14				
	12.52		12.52				
⊙	4.21	899.83	4.30	895.62			
	8.31		8.22				
	12.52		12.52				
⊙	6.56	905.15	1.24	898.59			
	5.97		11.28				
	12.53		12.52				
2-3			2.63	902.52		4 RD. OPP. CENTER SOUTH	
			9.89				
			12.52				
	5.18	900.31	10.02	895.13			
	7.35		7.50				
	12.53		12.52				
2-2			3.03	897.27		4 RD. OPP. 4 ORIGIN SOUTH	
			9.49				
			12.52				

STA.	+	H.I.	−	EL.	ADJ. EL.		
⊙	5.57	902.23	3.64	376.66			
	6.95		8.88				
	12.52		12.52				
Z-1			3.06	899.17		Q RD. OPR. & DRIVE 140'±TH	
			9.46				
			12.52				
⊙	7.40	909.22	0.41	901.82			
	5.12		12.11				
	12.52		12.52				
⊙	1.14	903.25	7.11	902.11			
	11.38		5.41				
	12.52		12.52				
⊙	0.11	893.96	9.40	893.85			
	12.41		3.12				
	12.52		12.52				
⊙	1.60	886.64	8.92	885.04			
	10.92		3.60				
	12.52		12.52				
USC&GS			2.97	883.67 +02	883.65	ST'D. USC&GS DISC SET IN TOP	
BM-L78			9.55			NW WINGWALL OF US421 BRIDGE	
			12.52			OVER FINLEY CREEK	

C.A. Budnick, Surveyor
6030 Harbour Town Court
Noblesville, IN 46060

JOB KUCERA-ENLAND-CHERRY LINE BENCH & PHOTO LEVELS
P.O. # 02831/22.14 FILE # 06180201 0.50
SURVEYED BY CAB/CD DATE 5/15/83
CHECKED BY _____ DATE _____
COMPUTED BY CAB DATE 5/21/83
SHEET # 11 OF 12

INSTRUMENT # WILD N-2 SERIAL # _____

INSTRUMENT # _____ SERIAL # _____

STA.	+	H.I.	−	EL.	ADJ. EL.		
TBM #2	6.43	336.54			879.91	CHISELED "□" N.W. COR. N. HOWL.	
(21)			9.8	876.5		℄ STREAM OPP. OBSERVATION WELL EAST	
○	5.63	890.97	1.00	335.34			
(22)			12.5	878.5		℄ STREAM OPP. OBSERVATION WELL EAST.	
TBM #3	3.97	890.80	4.14	886.83		NAIL & RIBBON IN TOP OF TREE STUMP.	
(23)			10.9	879.9		℄ STREAM @ FALLEN LOG ACROSS STREAM.	
TBM #3	6.43	893.26	3.97	886.83			
(24)			10.6	882.7		℄ STREAM @ N. FENCE LINE	
○	4.23	888.39	3.60	884.66			
TBM #2	4.15	884.06	3.97	879.92	879.91	CHISELED "□" N.W. COR. N. HOWL.	
(30)			5.1	879.0		APPROX. NATURAL GROUND @ OBSERVATION WELL	
(29)			7.8	876.3		INV. OUTLET 10" CMP	
(31)			9.43	874.63		INV. INLET 30" CMP-EAST	PARTIALLY SILTED TWIN PIPE STRUCTURE
(32)			9.40	874.66		INV. INLET 30" CMP-WEST	OUTLET END IS
(33)			9.05	875.01		INV. OUTLET 30" CMP-EAST	HIGHER THAN
(34)			9.21	874.85		INV. OUTLET 30" CMP-WEST	INLET END.
TBM #1	4.76	884.31	4.51	879.55	879.55	CHISELED "□" @ S.E. COR. S. HOWL.	
(28)			5.5	878.8		APPROX. INV. OUTLET 12" CMP	
○	10.75	891.21	3.85	880.46			
(27)			8.4	882.8		APPROX. INV. INLET 12" CMP (SILTED)	
(26)			7.4	883.8		℄ STREAM OPP. BEND IN FENCE NORTH-EAST	
(25)			5.4	885.8		℄ STREAM IN LINE WITH FENCE LINE-EAST	
TBM #1			11.67	879.54	879.55		

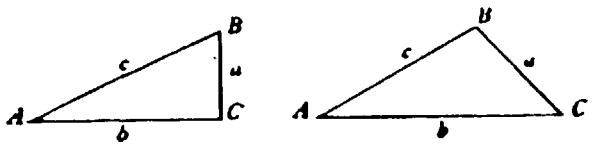
LINE COMPUTATIONS SHEET 12 OF 12
JOB KUCERA ENVIRO - CHEM
P.O. # 0283122.14
FILE # 061802010230.
COMPUTED BY CAB DATE 5/21/83
CHECKED BY _____ DATE _____

Coordinate Dump

1 •
13 •

1 •
922,337 • 0533
725,949 • 3393
2 •
922,353 • 1579
725,968 • 1988
3 •
922,336 • 1133
725,968 • 6264
4 •
922,323 • 6300
725,653 • 6738
5 •
922,340 • 2466
725,586 • 6633
6 •
922,317 • 7449
725,586 • 0494
7 •
922,264 • 3817
725,004 • 1344
8 •
923,918 • 1496
724,428 • 6561
9 •
919,676 • 3354
725,981 • 2191
10 •
920,919 • 6813
725,525 • 5477
11 •
921,428 • 2698
725,400 • 9022
12 •
922,133 • 5982
725,160 • 7421
13 •
922,597 • 8785
724,953 • 7659

FORMULAE FOR SOLVING RIGHT TRIANGLES



$\text{Sin } A = \frac{a}{c} = \text{Cos } B$ $\quad \text{Cot } A = \frac{b}{a} = \text{Tag } B$

$\text{Cos } A = \frac{b}{c} = \text{Sin } B$ $\quad \text{Sec } A = \frac{c}{b} = \text{Cosec } B$

$\text{Tan } A = \frac{a}{b} = \text{Cot } B$ $\quad \text{Cosec } A = \frac{c}{a} = \text{Sec } B$

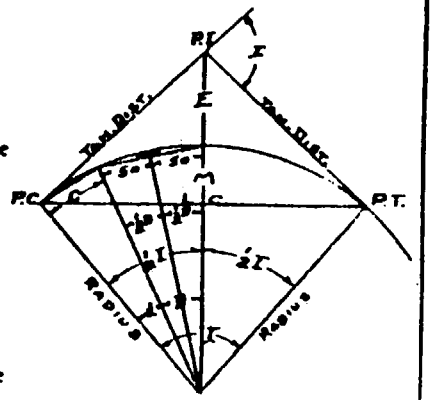
Given	Required	Solution
A, c	B, a, b	$B = 90° - A, a = C \sin A, b = C \cos A.$
A, b	B, a, c	$B = 90° - A, a = b \tan A, C = \frac{b}{\cos A}.$
A, a	B, b, c	$B = 90° - A, b = a \cot A, C = \frac{a}{\sin A}.$
a, c	A, B, b	$\sin A = \frac{a}{c}, \cos B = \frac{a}{c}, b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b}, \cot B = \frac{a}{b}, c = \sqrt{a^2 + b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a}, c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$
a, b, C	A, c	$A + B = 180° - C, C = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $\frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

CURVE FORMULAE

D = Degree of Curve
1° = 1-Degree of Curve
2° = 2-Degree of Curve
P.C. = Point of Curve
P.T. = Point of Tangent
P.I. = Point of Intersection
I = Intersection of Angle, Angle Between Two Tangents
L = Length of Curve, from P.C. to P.T.
T = Tangent Distance
E = External Distance
R = Radius
L.C. = Length of Chord
M = Length of Middle Ordinate
c = Length of Sub-Chord
d = Angle of Sub-Chord



$R = \frac{L.C.}{2 \sin \frac{1}{2} I}$ $\quad T = R \tan \frac{1}{2} I = \frac{L.C.}{2 \cos \frac{1}{2} I}$

$\frac{L.C.}{2} = R \sin \frac{I}{2}$, $D 1° = R = 5729.58$, $D 2° = \frac{5729.58}{2}$, $D = \frac{5729.58}{R}$

$M = R (1 - \cos \frac{1}{2} I), = R - R \cos \frac{I}{2}$

$\frac{E+R}{R} = \sec \frac{I}{2}$, $\frac{R-M}{R} = \cos \frac{I}{2}$

$c = 2 R \sin \frac{1}{2} d$, $d = \frac{c}{2R}$

$L.C. = 2 R \sin \frac{1}{2} I$, $E = R (\sec \frac{1}{2} I - 1), = R \sec \frac{I}{2} - R$

Defl. ∠ (Minutes) = $\frac{\text{Length of Arc}}{R} \times 1718.87$

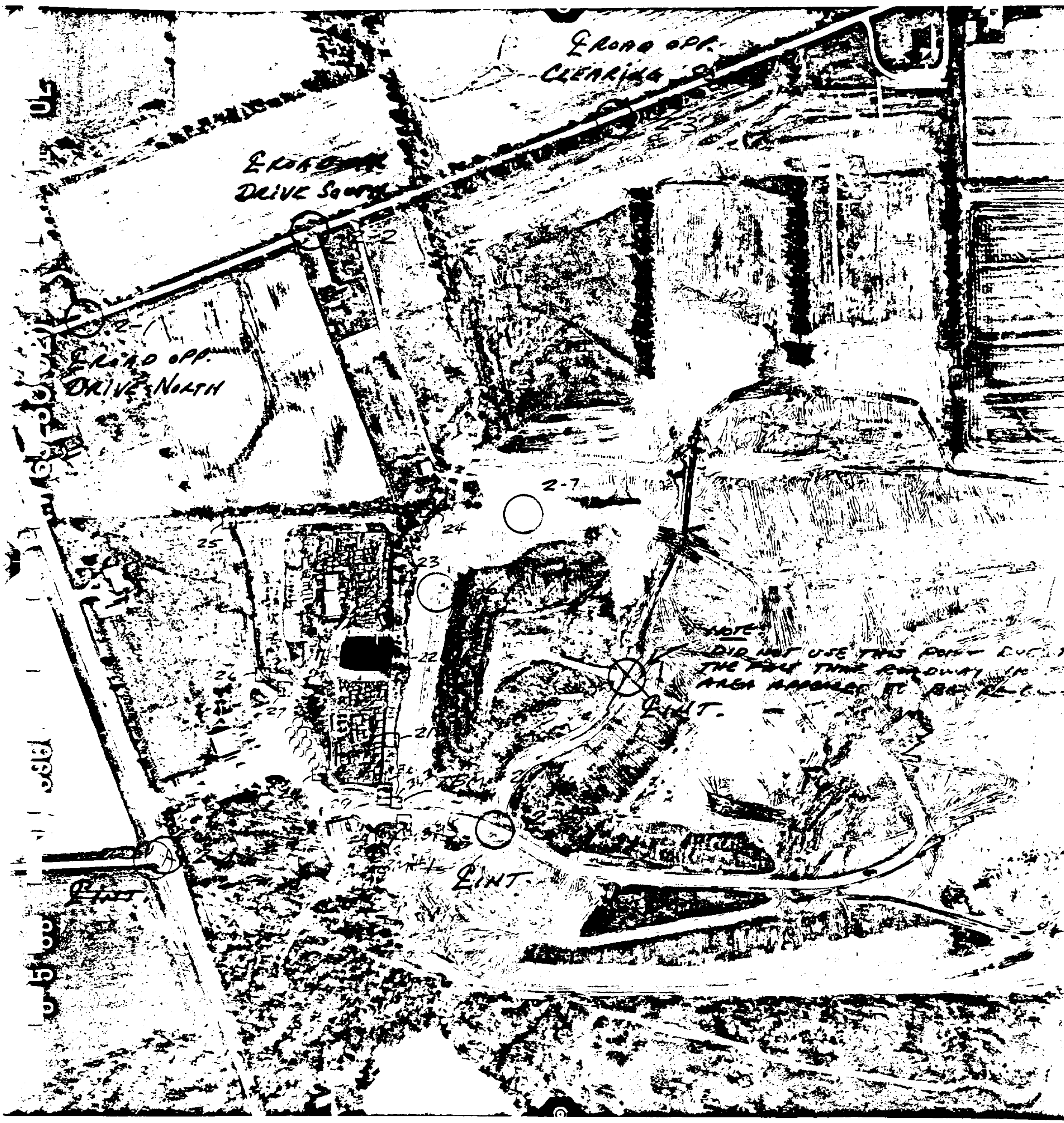
Minutes in Decimals of a Degree.

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

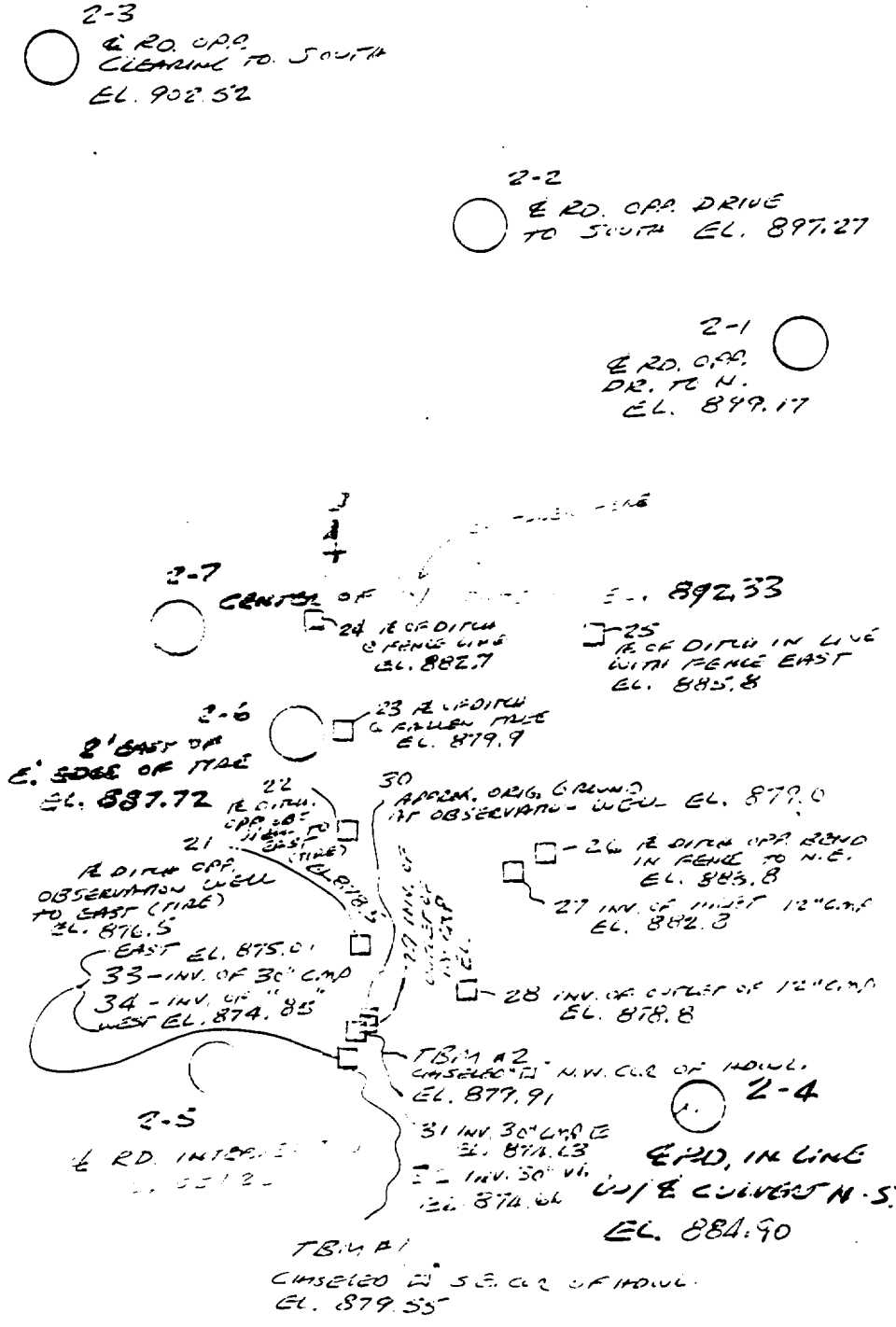
Inches in Decimals of a Foot.

0"	1/32 .0078	1/16 .0104	3/32 .0156	1/8 .0208	5/32 .0260	3/16 .0313	7/32 .0417	1/4 .0521	5/16 .0625	3/8 .0729
1	1/12 .0833	1/6 .1667	1/4 .2500	1/3 .3333	5/12 .4167	1/2 .5000	7/12 .5833	2/3 .6667	3/4 .7500	5/6 .8333	11/12 .9167

Temp. Corr. For Steel Tape:
Corr. = .00000645 x Distance x (T-68°)



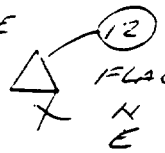
℄ ROAD OPP.
CLEARING
DRIVE SOUTH
2-2
2-1
℄ ROAD OPP.
DRIVE NORTH
2-7
24
25
23
22
21
26
27
NOTE
℄ INT.
℄ INT.


2-3
℄ RD. OPP.
CLEARING TO SOUTH
EL. 902.52
2-2
℄ RD. OPP. DRIVE
TO SOUTH EL. 897.27
2-1
℄ RD. OPP.
DR. TO N.
EL. 899.17
2-7
CENTER OF
EL. 892.33
24 R OF DITCH
& FENCE LINE
EL. 882.7
25
R OF DITCH IN LINE
WITH FENCE EAST
EL. 885.8
2-6
2' EAST OF
E. SIDE OF TILE
EL. 887.72
23 R DITCH
& FALLEN TREE
EL. 879.9
22
R DITCH
OPP. END OF
TILE EAST
(TILE)
EL. 878.5
21
R DITCH OPP.
OBSERVATION WELL
TO EAST (TILE)
EL. 876.5
30
APPROX. ORIG. GROUND
AT OBSERVATION WELL EL. 879.0
26 R DITCH OPP. BEND
IN FENCE TO N.E.
EL. 885.8
27 INV. OF INLET 12" C.M.P.
EL. 882.3
EAST EL. 875.01
33 - INV. OF 30" C.M.P.
34 - INV. OF "
WEST EL. 874.85
28 INV. OF OUTLET OF 12" C.M.P.
EL. 878.8
TBM A2
CHISELED "□" N.W. COR. OF INDIVL.
EL. 877.91
2-4
31 INV. 30" C.M.P. E
EL. 874.63
32 INV. 30" C.M.P.
EL. 874.61
℄ RD. IN LINE
W/ ℄ CULVERT N.S.
EL. 884.90
2-5
℄ RD. INTER
TBM A1
CHISELED "□" S.E. COR. OF INDIVL.
EL. 879.55

POWER POLE
N 922, 547.88
E 724, 953.77

CORNER FENCE POST
N 922, 336.11
E 725, 968.63

CORNER FENCE POST
N 922, 317.74
E 725, 586.05



FLAG POLE
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E 725, 160.74

POWER POLE
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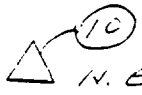
E 725, 400.90



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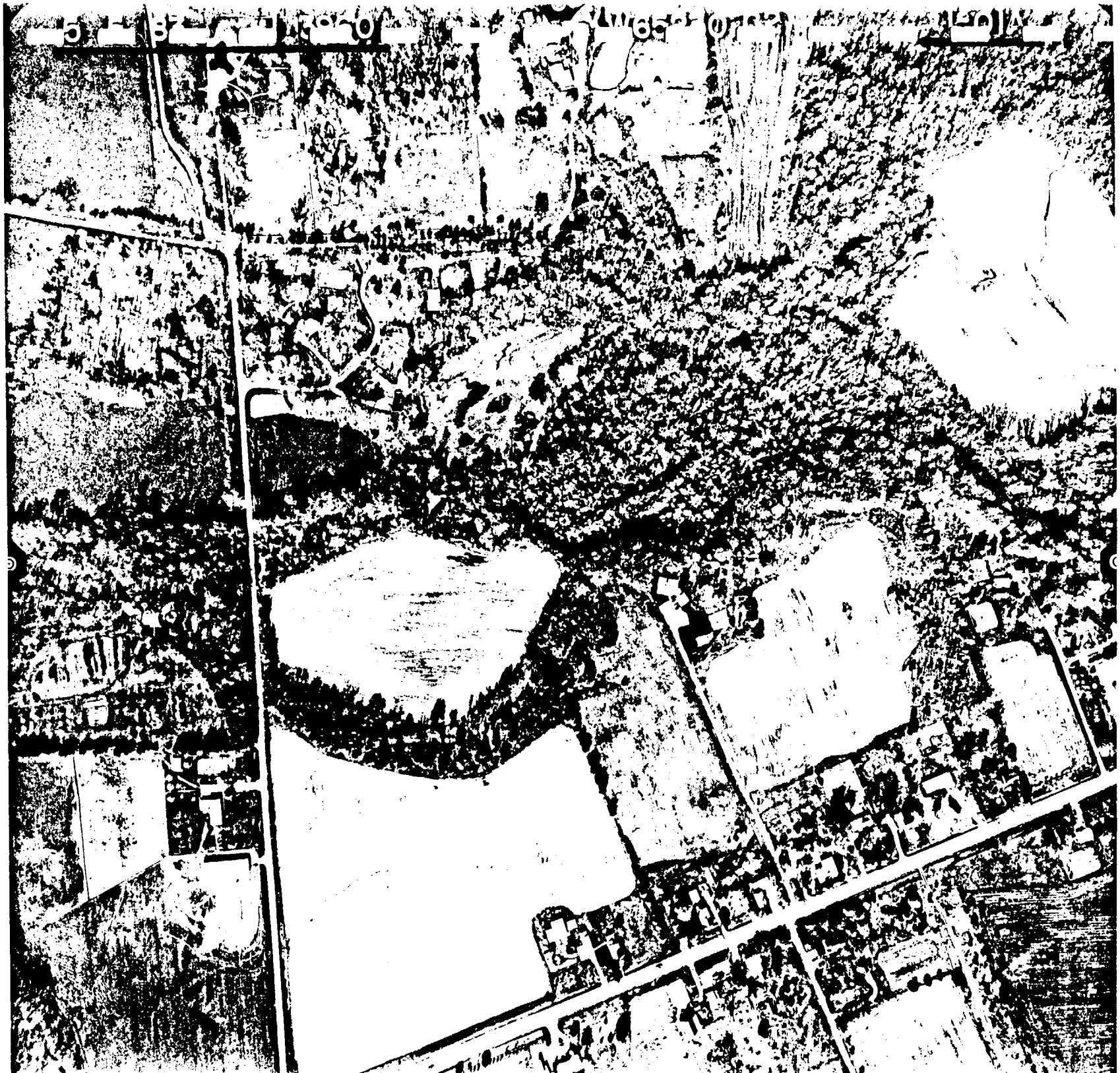

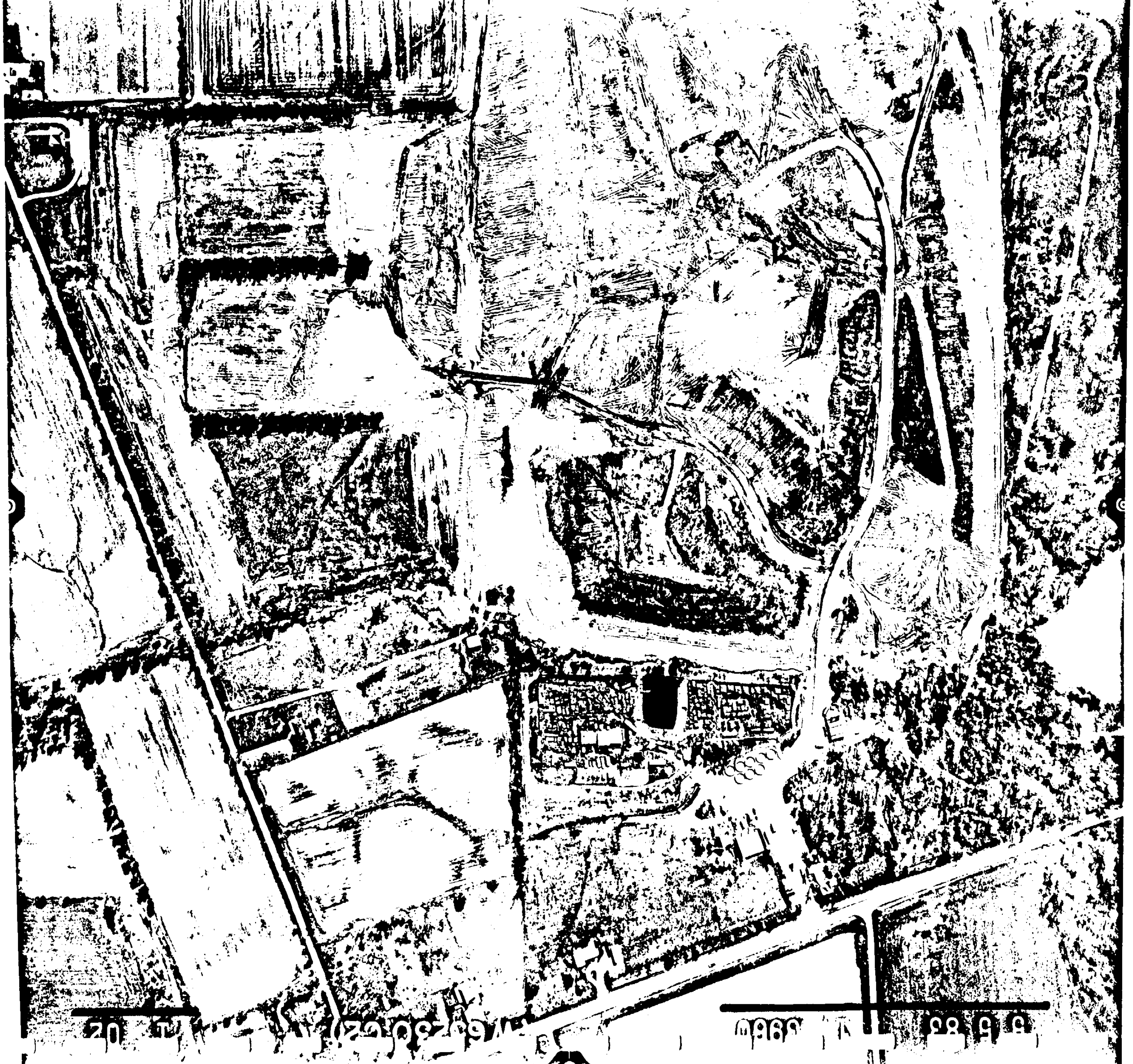

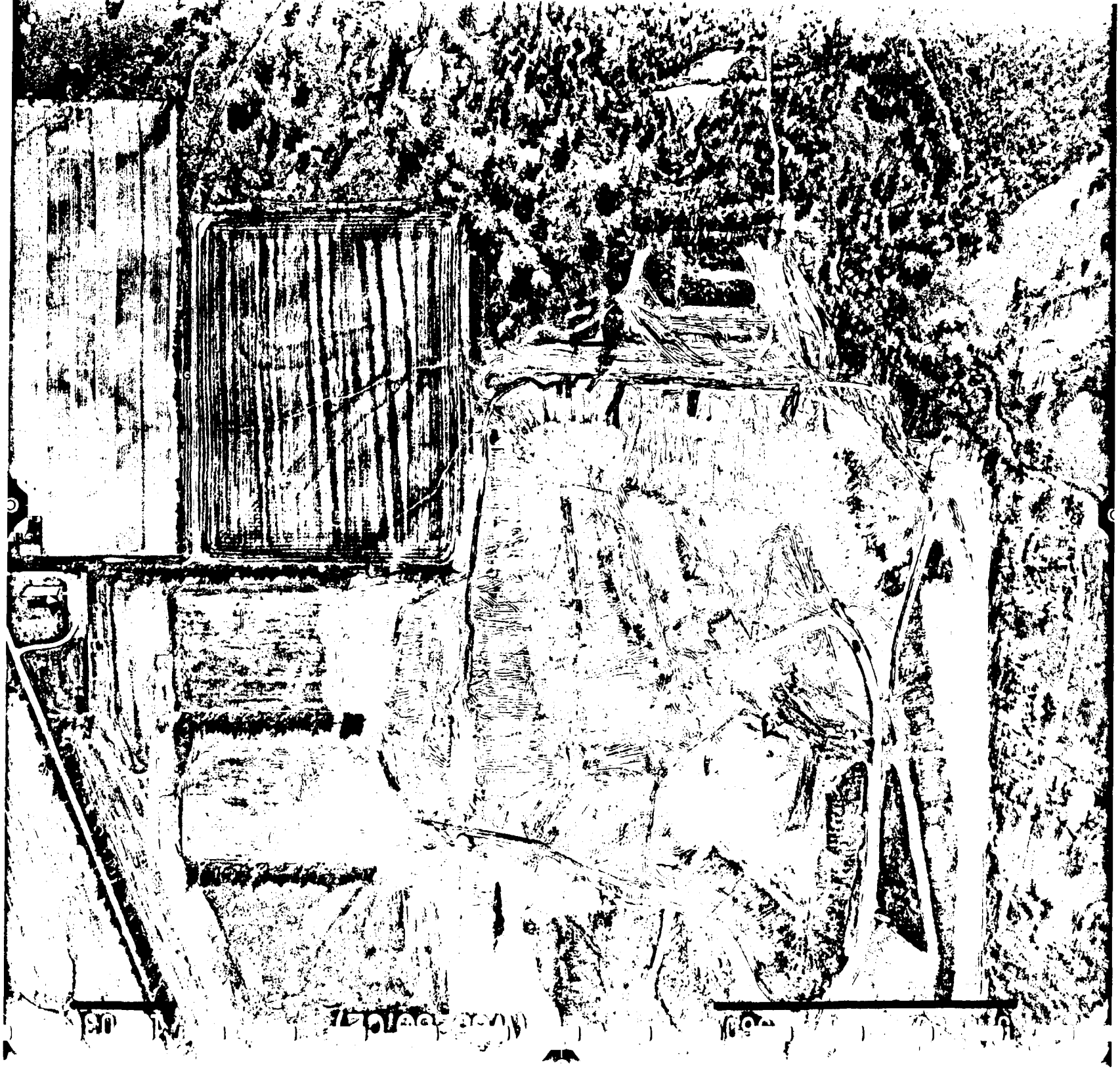

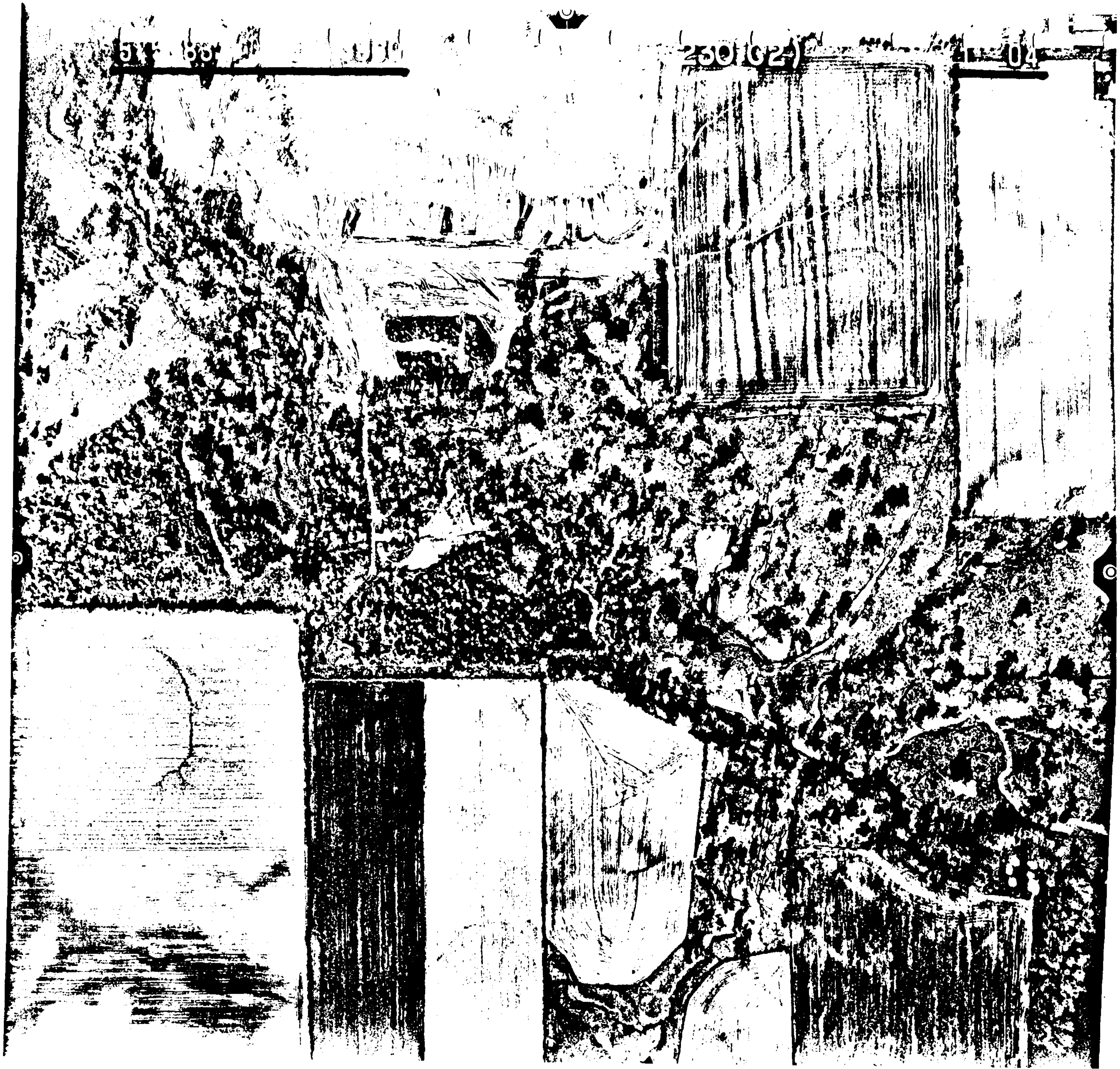
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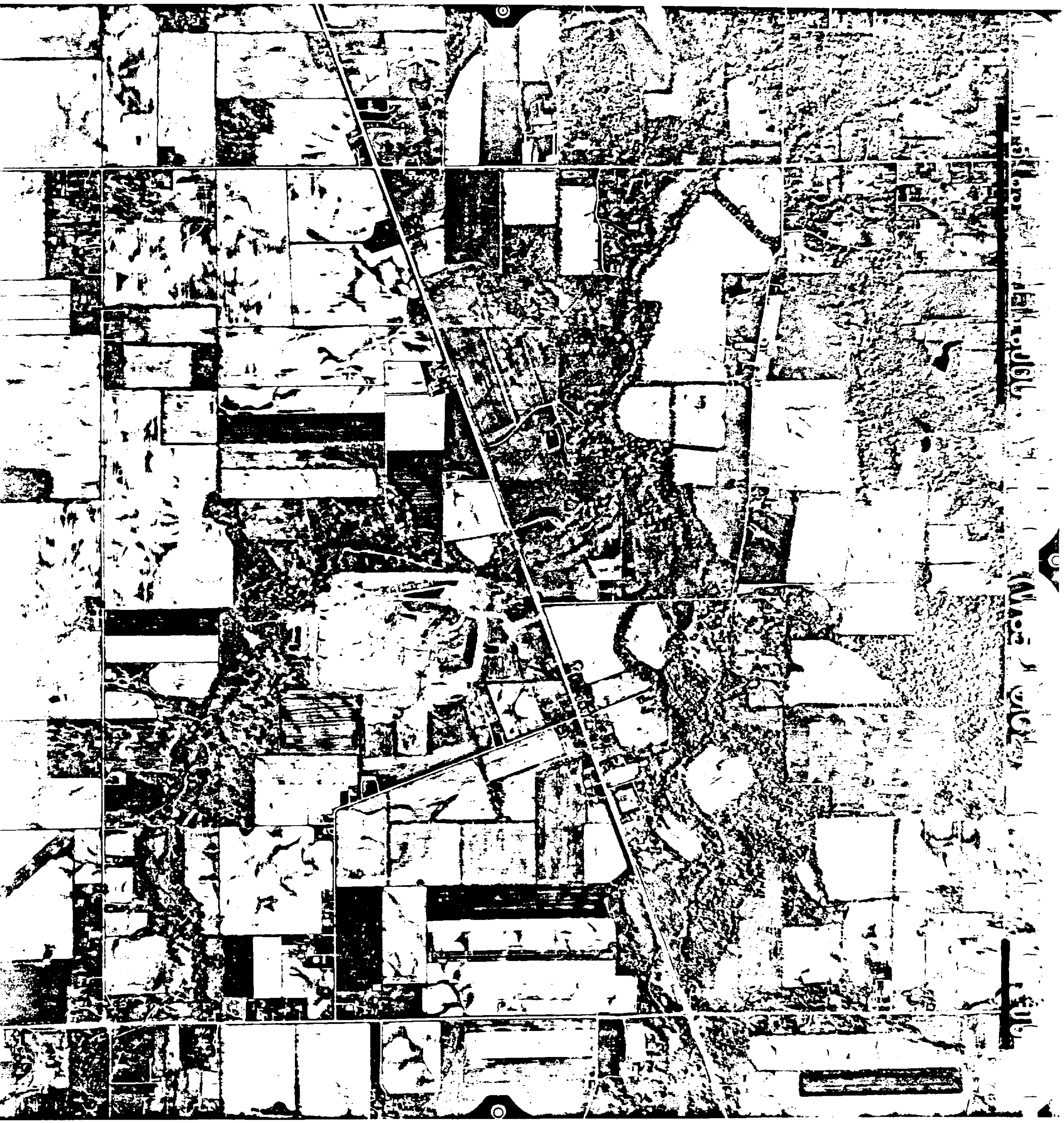

SUBTASK 2-5

SUBTASK 2-5 - WORK PLAN UPDATE

The original work plan (dated April 15, 1983) listed three main activities for the ECC site. These activities were:

1. Focused RI/FS
2. Remedial Investigation (RI)
3. Feasibility Study (FS)

The first activity, completion of a focused RI/FS for the site, has been completed and a report was issued to U.S. EPA on April 21, 1983. The third activity, conducting a feasibility study for the site, will not be initiated until early 1984. The work plan update described under this subtask will pertain only to the second activity, the site Remedial Investigation.

Following is an update of the tasks and subtasks listed in the original Remedial Investigation work plan:

Task 1 - Development of Work Plan

This activity has been completed, except for the site-specific quality assurance project plan (QAPP). It refined the scope of work for the RI developed in the RAMP and established a time schedule and work plan to implement the recommended RI activities. The final work plan was submitted to the RSPO on April 15, 1983. The QAPP will be submitted as part of the summary report for Task 2 - Site Definition Activities. This change was made because the QAPP cannot be properly prepared until the data gathering and safety assessment activities of Task 2 have been completed.

Task 2 - Site Definition Activities

The original work plan listed the following activities as subtasks for Task 2.

- o 2-1 - Gathering Background Data
- o 2-2 - Site Safety Facilities
- o 2-3 - Prepare Site Health and Safety Assessment
- o 2-4 - Site Mapping
- o 2-5 - Work Plan Update and Report

Subtask 2-1, 2-3 and 2-4 have been completed. Subtask 2-3 was not completed since it was determined that site safety facilities would not be required for the RI phase. Subtask 2-6 - Residential Well Sampling, and Subtask 2-7 - Preparation of a QAPP, were added to the scope of work for Task 2 and are nearly complete. This document represents the work plan update and report required by Subtask 2-5.

Task 3 - Detailed Site Characterization Studies

The following change has been made to the original work plan for Task 3 of the Remedial Investigation activity in Subtask 3-1 - Hydrogeologic Study. The original work plan called for the installation of four clusters of three wells, a total of twelve wells. During drilling of the initial wells, the decisions were made to install four deep wells, one intermediate well and five shallow wells, for a total of 10 wells.

Project Deliverably

Anticipated issue dates of project deliverables have been revised and are presented in Table 1.

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Table 1
LIST OF PROJECT DELIVERABLES[a]

	Task	Issue Date	Actual Issue Date
Draft Work Plan	B-1-3	4/1/83	4/1/83
Draft Focused RI/FS Report[b]	A-3	4/17/83	4/8/83
Final Work Plan (or within 7 days of receipt of EPA comments)	B-1-3	4/15/83	4/15/83
Final Focused RI/FS Report	A-3	4/19/83	4/18/83
Project QA Plan	B-1-2	7/18/83	
Health and Safety Plan	B-2-3	7/18/83	
Site Definition Activities Summary Report	B-2-5	7/18/83	
Hydrogeologic Study Report	B-3-1	8/1/83	
Surface Water Testing Report	B-3-3	9/19/83	
Groundwater Testing Report (1st and 2nd Quarters)	B-3-2	11/28/83	
Soil Testing Report	B-3-4	10/31/83	
Site Hazards Assessment	B-4-1	11/14/83	
Draft Remedial Investigative Report	B-4-3	12/19/83	
Final Remedial Investigative Report	B-4-3	1/16/84	

LIST OF PROJECT DELIVERABLES[a]

	Task	Anticipated Issue Date
Screening Process Informational Report	C-1-2	1/23/84
Technology Assessment Report	C-1-4	3/19/84
Alternative Description Report	C-1-5	3/26/84
Economic Assessment Report	C-1-6	4/2/84
Environmental Assessment Report	C-1-7	4/9/84
Engineering Assessment Report	C-1-8	4/16/84
Comparative Ranking Report	C-1-9	4/23/84
Comparative Ranking Review Process Report	C-1-10	5/7/84
Draft Alternative Actions Feasibility Report	C-2	5/14/86
Final Alternative Actions Feasibility Report	C-2	6/10/84
Draft Conceptual Design Report	C-3-3	7/2/84
Final Conceptual Design Report	C-3-5	7/23/84

[a]Not including monthly reports.

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SUBTASK 2-6

SUBTASK 2-6 - RESIDENTIAL WELL SAMPLING

The final RAMP for the ECC site recommended a residential well sampling and analysis program for residences in the immediate vicinity of the site. This program was to have been implemented as an initial remedial measure (IRM). It was later determined by U.S. EPA headquarters that residential well sampling could not be conducted as an IRM.

At the request of the RSPO, the residential well sampling program was incorporated into the RI/FS as Subtask 2-6 of the Site Definition Activities phase. The residential well sampling program was implemented on May 10 and 11, 1983. The attached Technical Memorandum No. 2 describes the residential sampling program. As of the date of this report, no test data has yet been received from the testing laboratories.

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TECHNICAL MEMORANDUM NO. 2: Residential Well Sampling Near ECC Site

PROJECT SITE: ECC, Zionsville, Indiana

PROJECT NUMBER: CH2M HILL No. - W65230.C2
EPA Contract No. - 18.5L30.0

DATE: July 18, 1983

On May 10, 1983 water samples were collected from five residential wells near the ECC site. The assigned case number was 1691. The sampling team leader was Gerald Bills. He was assisted by Tom Gilgenbach, Dennis Totzke, and Phil Smith. Also present, but mostly observing, were Ike Johnson and Randy Weltzin of CH2M HILL and Pete Gorton of Ecology and Environment. Table 1 gives a summary of the samples taken from the residential wells.

All wells were pumped for 15 minutes before a sample was taken. Samples were preserved and packed per EPA contract laboratory protocol. The samples were shipped via Federal Express to the appropriate contract laboratories on the same day the samples were taken. Samples for organic analyses were shipped to California Analytical Laboratories. Samples for Task 1 and 2 inorganics and Task 3 cyanide analyses were shipped to the University of Washington. On May 11, 1983, Eileen O'Conner of the Sample Management Office was given the Federal Express airbill number.

On May 16, copies of the organic and inorganic traffic reports and the chain of custody were sent to Chuck Elly at Region V, U.S. EPA.

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Table 1
SUMMARY OF RESIDENTIAL WELL SAMPLES TAKEN ON
MAY 10, 1983, NEAR THE ECC SITE

Owner of Residential Well	Time of Collection	CH2M HILL Sample Number	Organic Traffic Report Number	Inorganic Traffic Report Number	Chain of Custody Number	Federal Express Air Bill Number
Blank	12:00 noon	ECC-RW001-001	E2790	ME0627	5-3173 5-3174	226490821 226490832
John Bankert, Sr. 985 South S.R. 421 Zionsville, IN	11:00 a.m.	ECC-RW003-001	E2792	ME0629	5-3173 5-3174	226490821 226490832
David Roush 795 South S.R. 421 Zionsville, IN	3:40 p.m.	ECC-RW004-001	E2793	ME0630	5-3173 5-3175	226490821 226490832
Ira Jennings R.R. #1 Zionsville, IN	12:15 p.m.	ECC-RW005-001	E2794	ME0631	5-3173 5-3175	226490821 226490832
Ira Jennings R.R. #1 Zionsville, IN	12:15 p.m.	ECC-RW005-002	E2795	ME0632	5-3173 5-3176	226490821 226490832
George Holley 1120 South S.R. 421 Zionsville, IN	1:20 p.m.	ECC-RW006-003	E2796	ME0633	5-3173 5-3176	226490821 226490832
Robert Vandergriff 1115 South S.R. 421 Zionsville, IN	3:14 p.m.	ECC-RW007-004	E2797	ME0634	5-3173 5-3177	226490821 226490832

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SUBTASK 2-7

SUBTASK 2-7 - QUALITY ASSURANCE PROJECT PLAN

A site-specific quality assurance project plan (QAPP) was prepared for the sampling and testing work to be conducted at the ECC site. Whenever appropriate, the QAPP referenced Federal, State, or other project documents. The draft QAPP for the ECC site is attached to this report.

GLT424/42

DRAFT

QUALITY ASSURANCE PROJECT PLAN FOR THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY AT ENVIRONMENTAL CONSERVATION AND CHEMICAL CORP. ZIONSVILLE, INDIANA

U.S. EPA Work Authorization 18.5L30.0
18.5M30.0

Signatures:

U.S. EPA Remedial Site Project Officer	CH2M HILL Remedial Site Project Manager
U.S. EPA Quality Assurance Officer	CH2M HILL Quality Assurance Manager

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2. TABLE OF CONTENTS

3. INTRODUCTION

Environmental Protection Agency (EPA) policy requires participation by all EPA Contractors in a centrally-managed quality assurance (QA) program. This requirement applies to all environmental monitoring and measurement efforts mandated or supported by EPA.

Each Contractor generating data has the responsibility to implement minimum procedures that assure the precision, accuracy, completeness, and representativeness of its data are known and documented. In addition, the Contractor should specify the quality levels that data must meet in order to be acceptable. To ensure that this responsibility is met uniformly, each EPA Contractor must have a written QA Project Plan (QAPP) covering each project that it is contracted to perform.

QA Project Plans are written documents to be prepared by the responsible Contractor. The QAPP presents, in specific terms, the policies, organization, objectives, functional activities, and specific QA and quality control (QC) activities designed to achieve the data quality goals of the specific project.

4. PROJECT DESCRIPTION

The remedial investigation/feasibility study (RI/FS) for the ECC site is intended to identify and evaluate alternative source control remedial response actions, to recommend the most cost-effective alternatives pursuant to the National Contingency Plan, and to prepare a conceptual design of the remedial response action alternatives selected by the EPA in consultation with the State of Indiana. To accomplish these goals, the following general tasks need to be completed:

- Characterize the soil and groundwater contamination at the site.
- Characterize the soil and groundwater contamination that may have migrated from the site.
- Identify specific contaminants posing acute hazards to public health.
- Identify pathways of contaminant migration from the site.
- Determine and describe onsite physical features that could affect migration of contaminants, methods of containment, or methods of remedial action cleanup.
- Develop viable remedial action alternatives.
- Permit the evaluation of the remedial action alternatives.

- Recommend the most cost-effective remedial action alternative for the site.

- Prepare a conceptual design of the recommended remedial action alternative.

5. PROJECT ORGANIZATION

Figure 1 illustrates the project organization and line of authority for the ECC RI/FS project. Both project technical personnel and firm quality assurance personnel are indicated in the figure. Primary responsibility for project quality review rests in the RSPM and the RPTL. Independent quality assurance review is provided by the QAM and the QA auditors.

Where quality assurance problems or deficiencies requiring special action are uncovered, the RSPM, RPTL, and QAM will identify the appropriate corrective action to be initiated by the RSPM.

GLT424/5

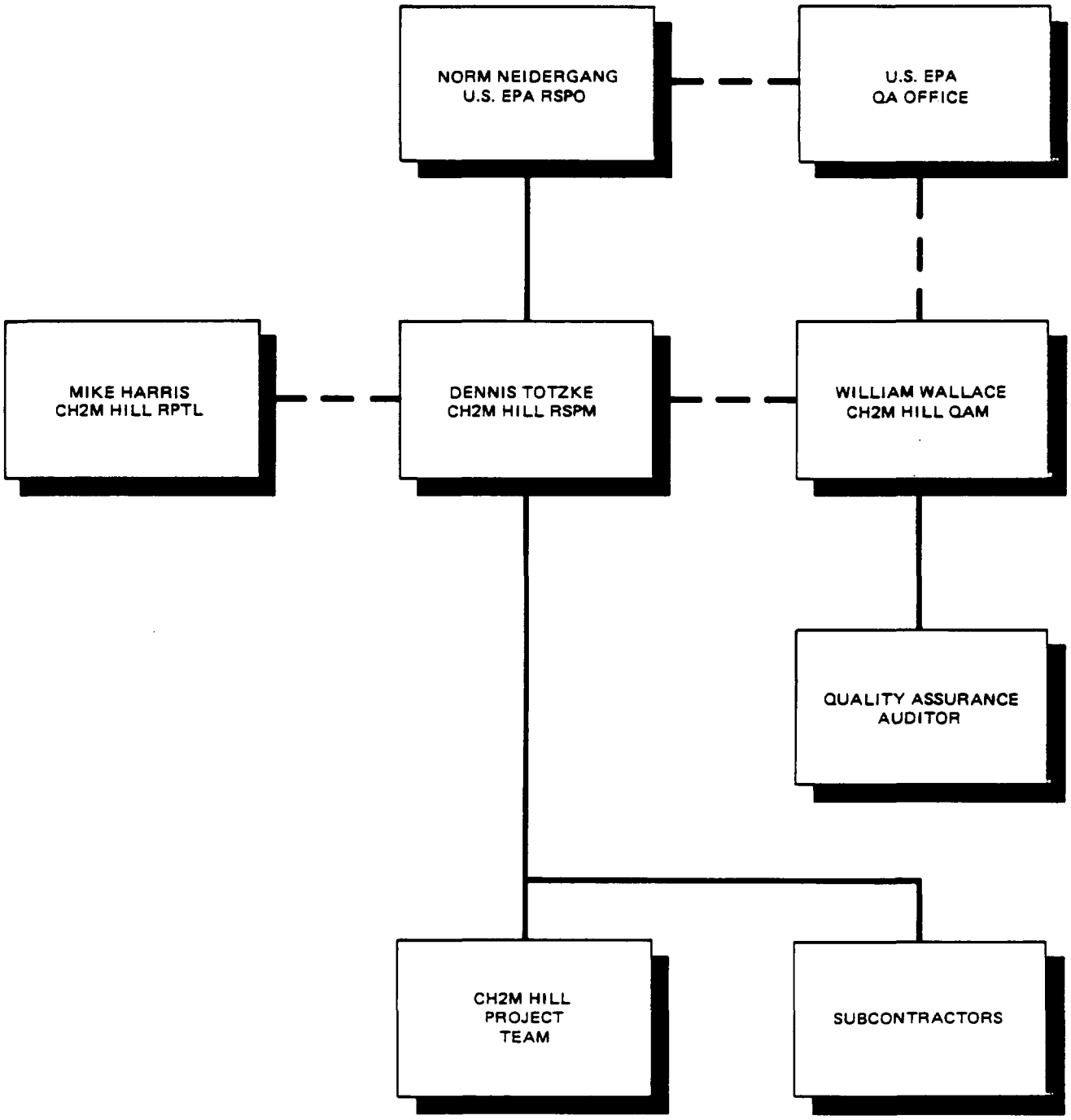

FIGURE 1
ECC RI/FS PROJECT ORGANIZATION
ECC SITE

6. QUALITY ASSURANCE OBJECTIVES

The general quality assurance objective for measurement data is to ensure that environmental monitoring data of known and acceptable quality are provided.

For this project, the specific objectives for measurement data in terms of precision, accuracy and compatibility are the same as the objectives established for the Contract Laboratory Program and the laboratories performing the various analyses and generating the measurement data. The specific objectives for measurement data, in terms of completeness and representativeness, are those established for the individual sampling tests described in the applicable task sampling plan (See Section 18).

7. SAMPLING PROCEDURES

The objective of sampling procedures is to obtain samples that represent the environmental matrix being investigated. Trace levels of contaminants from external sources must be eliminated through the use of good sampling techniques and proper selection of sampling equipment.

When sampling of air, water, sediments, soils, or wastes is required, a detailed sampling plan will be developed for each field sampling program and will be appended to the QAPP. Source material to be used in developing the sampling plans includes the following:

- Samplers and Sampling Procedures for Hazardous Waste Streams (EPA-600/2-80-018)
- Test Methods for Evaluating Solid Wastes (EPA SW 846-1980)
- User's Guide to the EPA Contract Laboratory Program
- EPA Technical Monographs
    - 15--Purposes and Objectives of Sampling
    - 16--Water Sampling Methods
    - 17--Soil and Sediment Sampling Methods
    - 18--Sampling of Biological Specimens
    - 19--Methods of Collecting Concentrated (Hazardous) Samples
    - 20--Container Opening Techniques
    - 22--Sample Handling, Packaging, and Shipping Procedures

At a minimum, the field sampling program sampling plan will include the following:

- Number of locations to be sampled
- Sampling procedures to be used at the site
- Tests to be completed at each sampling location
- Sampling equipment required at the site
- Sample containers required at the site
- Analytical procedures to be used
- Preservation methods to be used at the site for various types of samples
- Reagents, etc., required at the site for sample preservation
- Shipping containers required at the site
- Chain-of-custody procedures to be used at the site
- Shipping methods and destinations, marking instructions, special labels, etc.

8. SAMPLE CUSTODY

Sample custody procedures for this project will be in strict conformance with the procedures detailed in Appendix B - Sample Identification and Custody Procedures, of the User's Guide to the EPA Contract Laboratory Program.

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9. EQUIPMENT CALIBRATION

All field equipment utilized during this project will be calibrated and operated in accordance with Ecology and Environment's standard operating procedure entitled, "FIT Equipment Calibration, Operating and Maintenance Program." Any field equipment utilized during this project that is not covered by E&E's standard operating procedures will have a specific calibration and operation instruction sheet prepared for it. The specific instruction sheet(s) will be appended to this document.

10. ANALYTICAL PROCEDURES

Any samples collected during this project will be analyzed for the appropriately selected parameters in accordance with the standard analytical procedures established by the U.S. EPA for the Contract Laboratory Program. Special analytical procedures required for special tests will be described in the task-specific sampling plan that will be appended to this document.

11. DATA ANALYSIS

All raw data collected from project sampling tasks and used in project reports will be appropriately identified and will be included in a separate appendix within the final report. Where test data have been reduced, the method of reduction will be described in the report.

12. QUALITY CONTROL PROCEDURES

Project quality control will involve the collection of field sample duplicates and blanks in accordance with the applicable U.S. EPA Technical Monograph listed in Section 7 of this plan. In addition, the standard quality control procedures of the Contract Laboratory Program will be employed to provide consistent, accurate, and dependable test results.

13. AUDIT PROCEDURES

The Quality Assurance Manager (QAM) will monitor and audit the performance of the quality assurance procedures listed in this plan to ensure that data of known and acceptable quality are provided. The QAM will conduct at least one (1) audit per year or per project, whichever is of the shorter duration.

The RPTL will review work product quality and will ensure that the project is performed in accordance with approved quality assurance procedures.

The Contract Laboratory Program will be subjected to audits by the U.S. EPA.

14. PREVENTIVE MAINTENANCE

Preventive maintenance procedures will be carried out on all field equipment in accordance with the procedures outlined in E&E's standard operating procedure entitled, "FIT Equipment Calibration, Operation and Maintenance Program." Any field equipment utilized during this project that is not covered by E&E's standard operating procedure will have a specific maintenance instruction sheet prepared for it. The specific instruction sheet(s) will be appended to this document.

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15. DATA ASSESSMENT PROCEDURES

Analytical data will be assessed by the Contract Laboratory Program in accordance with their standard procedures.

GLT424/15

16. CORRECTIVE ACTION PROCEDURES

Corrective action procedures that might be implemented based on audit results or upon detection of data unacceptability will be described in the task-specific sampling plan. The RSPM is responsible for initiating the corrective action. The RPTL is responsible for approving the corrective action.

17. QUALITY ASSURANCE REPORTS

For this project, no separate report is anticipated to describe the performance of the data measurement systems or the data quality. Instead, the final RI report and the final FS report will contain separate QA sections that summarize data quality information collected during the project.

18. SAMPLING PLAN

The objective of this sampling plan is to provide a document explaining sampling procedures and practices that will be used in the ECC remedial investigation sampling program.

TYPES OF SAMPLES

During the sampling program, five general types of samples will be collected. These are:

- Groundwater samples will be collected from each of the ten new groundwater monitoring wells and existing groundwater monitoring well MW-1 on a quarterly basis for one year, commencing after installation of the new wells.

- Residential well samples will be collected from the wells of five residences located near the ECC site.

- Sediment samples will be collected from a total of six sampling locations in Finley Creek, Eagle Creek and the unnamed ditch.

- A total of 40 soil samples will be collected onsite from locations yet to be identified.

- Surface water samples will be collected from a total of four sampling locations on Finley Creek, Eagle Creek and the unnamed ditch.

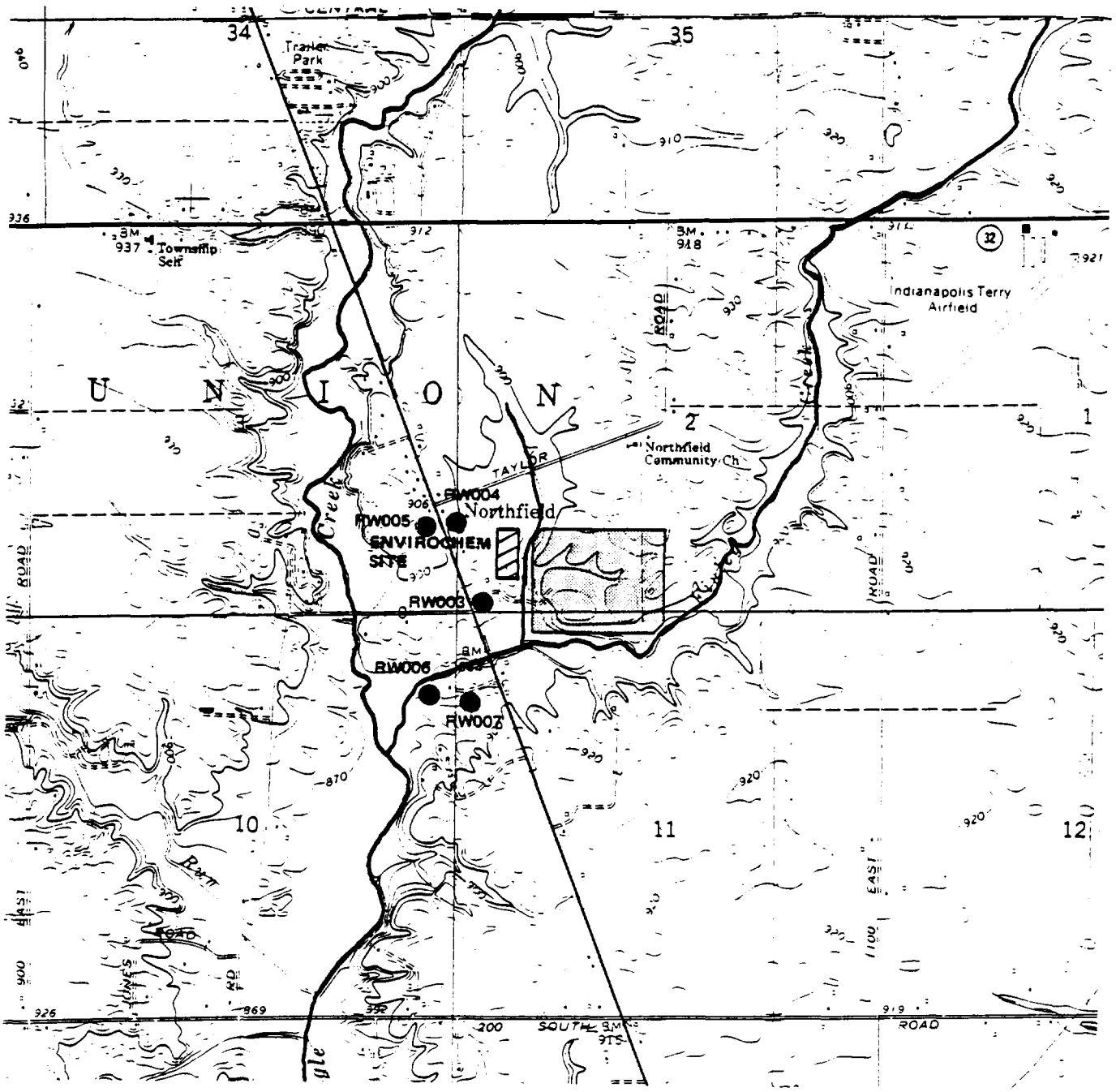
GENERAL SAMPLING LOCATIONS AND NUMBERS

Sample Locations

The general location of sampling sites (exclusive of soil) are shown in Figures 2 through 5. These sampling sites were selected during RAMP preparation and have been reviewed by U.S. EPA and ISBH personnel. The criteria used for selecting sites included upstream and downstream locations from tributaries where contamination is anticipated, upgradient and downgradient groundwater locations and areas where soil contamination is suspected. Exact sampling locations will be determined in the field. The sample team leader, along with U.S. EPA and ISBH personnel, will be responsible for determining the exact sampling location and recording the location in the field sampling notebook. The location will be described in the log book with a sketch that includes compass bearings and distances from numbered field reconnaissance stakes and other landmarks. The rationale of selecting a sampling location will also be included.

Sample Numbering System

A sample numbering system will be used to identify each sample taken during the remedial investigation sampling program. This numbering system will provide a tracking procedure to allow retrieval of information regarding a particular sample and to assure that each sample is uniquely numbered. A listing of the sample identification numbers will be maintained by the sample team leader. Each sample number will be composed of three to four components that are described below.



LEGEND

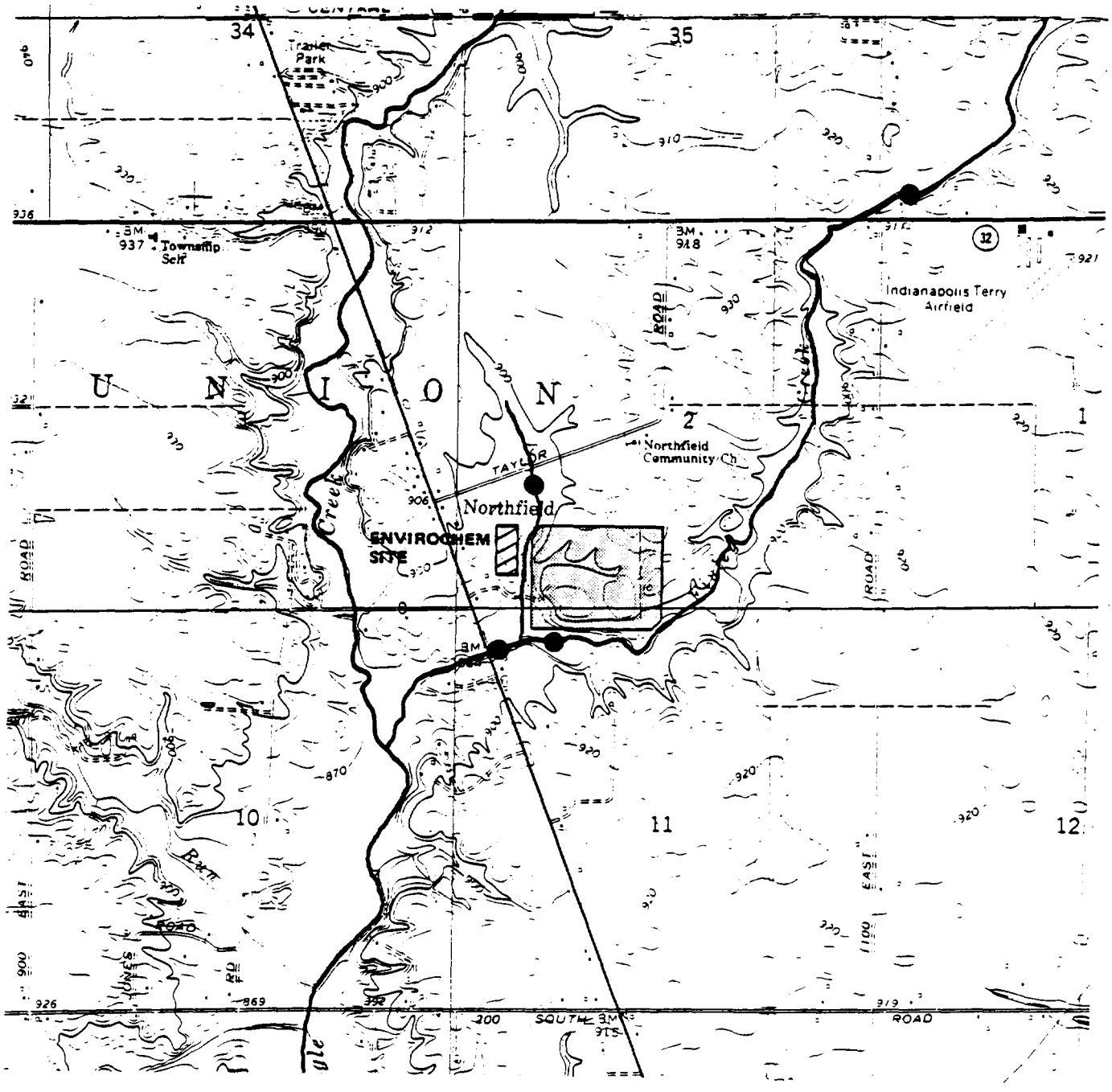
- NORTHSIDE LANDFILL
- SITE
- RESIDENTIAL WELL SAMPLING LOCATION (APPROXIMATE)

N

0 2000 4000

SCALE IN FEET

FIGURE 2
RESIDENTIAL WELL SAMPLING LOCATIONS
ECC SITE



LEGEND

- NORTHSIDE LANDFILL
- SITE
- SURFACE WATER SAMPLING LOCATIONS (APPROXIMATE)

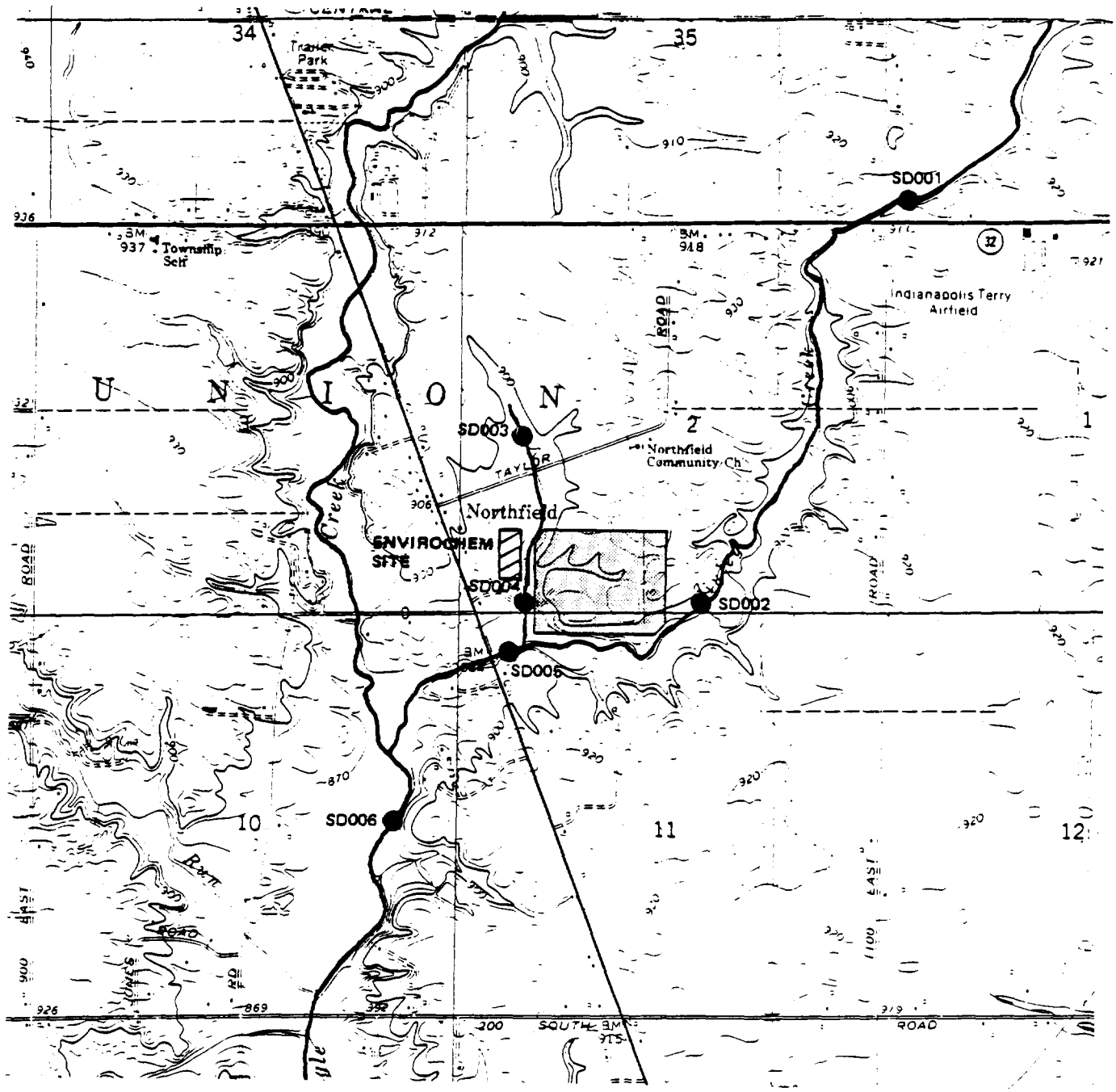
N

0 4000

2000

SCALE IN FEET

FIGURE 3
SURFACE WATER SAMPLING LOCATIONS
ECC SITE



LEGEND

- NORTHSIDE LANDFILL
- SITE
- SEDIMENT SAMPLING LOCATION (APPROXIMATE)

N

0 4000

2000

SCALE IN FEET

FIGURE 4
SEDIMENT SAMPLING LOCATIONS
ECC SITE

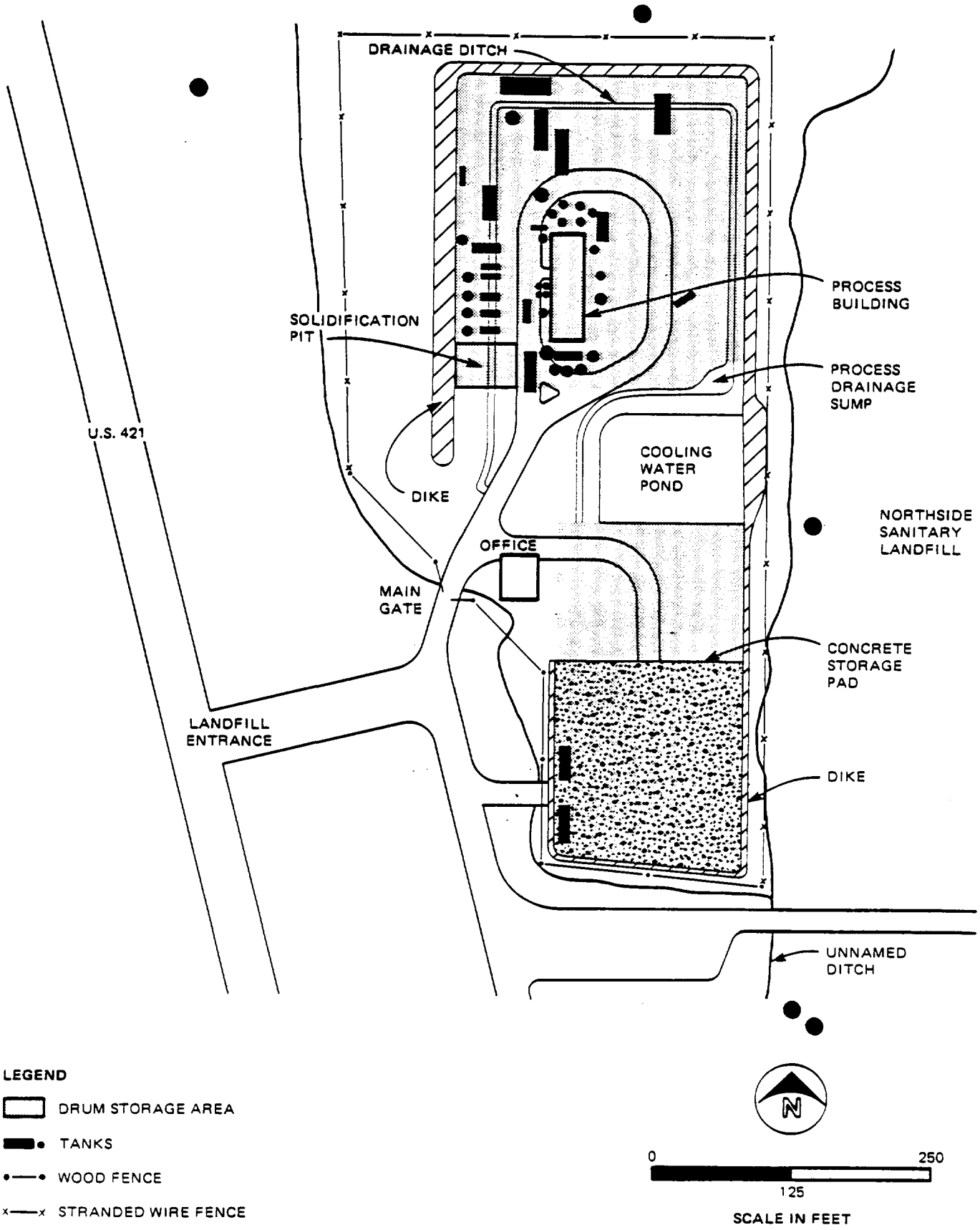


FIGURE 5
GROUNDWATER SAMPLING LOCATIONS
ECC SITE

Project Identification

A three letter designation will be used to identify the site where the sample is collected. For this project, it will be ECC, which stands for Environmental Conservation and Chemical Corp.

Sample Type and Location

Each sample type collected during the sampling program will be identified by a 2-digit alpha code.

- SS - Soil Sample
- RW - Residential Well Sample
- SW - Surface Water Sample
- SD - Sediment Sample
- GW - Groundwater Sample

A 3-digit number will immediately follow the 2-digit alpha code and will be used to indicate the sampling site location.

Sample Number

A 3-digit number will be used to consecutively number replicate samples taken at a sampling site. The exact sample location will be recorded in the field sampling notebook by the sampling team leader.

Sample Identifier Code

A 1-digit number will be used (when required) to provide additional information about the depth of the sample or the

technique used to obtain the sample. When a zero is used or no number is given in the fourth component slot, no additional information is being provided. The codes are:

- For sediment (SD) and soil (SS) samples

Code		Depth of Core
1	=	0 - 6"
2	=	6 - 12"
3	=	12 - 20"
4	=	other
5	=	other
6	=	other

If Codes 4, 5 or 6 are used, the actual length of core(s) will be recorded in the field sampling notebook.

- For surface water (SW) samples

Code	Depth of Sample
1	Surface
2	Mid-depth
3	Bottom
4	Integrated over whole water column
5	Other

The actual depth of each sample will be recorded in the field sampling notebook.

Sample Number Examples

Examples of sample numbers are:

- ECC-RW005-002

  ECC site - residential well water sample collected from location No. 5 - second well water sample taken.

- ECC-SD002-001-2

  ECC site - Sediment sample collected from location No. 2 - first sample taken - sample from 6-12" depth.

GENERAL SAMPLING EQUIPMENT AND OPERATION

Sample bottles and preservatives are discussed in Appendix A. Parameters to be analyzed for are listed in Appendix B.

Equipment

Sediment Sampling

Sediment samples will be taken using 2-inch diameter, 20-inch long stainless steel core samplers. Deep water core samples will be taken with a K-B type sampler with interchangeable stainless steel cores. Plastic inserts will be used for inorganic samples if the pH of the sediment is less than 5.0. The K-B sampler has a messenger-operated valve closure. A sample is taken by dropping the sampler over the side of a boat. When the operator thinks that the sampler has a valid sample, the seal is closed by the messenger. This creates a partial vacuum inside the core tube as the sampler is raised, and allows an intact core to be collected.

A hand core sampler will be used in shallow water. The hand core sampler operates with a flap valve that creates a partial vacuum as the sampler is raised. The hand core sampler is pushed into the sediment and then extracted with an intact core.

Surface Water Sampling

Surface water samples will be collected using a 4-liter stainless steel Kemmer type sampler and a stainless steel dip sampler. The Kemmer type sampler will be used to collect water samples at different depths. It is a messenger operated sampler. The sampler is set, lowered to the desired depth, and closed at the required depth with a messenger.

The dip sampler is composed of a 4-liter stainless steel beaker that is attached to a pole by an adjustable clamp. The dip sampler will be used to sample shallow water.

Residential Well Sampling

Residential wells will be pumped for a minimum of 15 minutes. Samples will be collected from a water system outlet as close to the source of water as possible (i.e., upstream of any water conditioning equipment such as a water softener). Water will be collected directly into the sampling container from the water system outlet.

Groundwater Sampling

Properly decontaminated equipment will be used in sampling all groundwater monitoring wells. After the introduction of the sampling pump and discharge tubing, the well will be

pumped until a minimum of 5 to 10 well volumes have been removed from the well. After the well has recovered, samples for inorganic and organic (excluding volatiles) analysis can be collected using the submersible pump. Samples for volatile organic analysis must be collected using a hand bailer or some other technique that minimizes water sample-to-air contact.

Soil Sampling

For surface soil samples, a stainless steel scoop or a stainless steel hand trowel will be used to collect the recommended quantity of sample soil. A stainless steel sieve may be used to screen rock soil before it is placed in the sample container.

For subsurface soil samples to a depth of 5 feet or less, a hand-driven hollow-stem stainless steel sampler will be used. The resultant total sample will then be divided into smaller samples representing the respective depth intervals.

Site-Specific Sampling Procedures

Sediment Sampling

Cores will be taken from six locations identified in the field reconnaissance survey. The exact location from which the cores will be taken will be determined in the field. Criteria used to determine the exact locations include horizontal and vertical extent of sedimentation, current velocity, water depth and sediment color and composition. Each core will be divided into approximately three, 6-inch long homo-

geneous samples. One 2-inch diameter, 6-inch long core will not contain enough sediment for the required analyses. Therefore, two replicate cores will be taken within about 6 inches of each other at each location sampled (Figure 6).

Analytical requirements necessitate that samples for inorganic and organic analyses be placed in different bottles.

Subsamples from each 6-inch segment are needed for screening. The procedures for cutting each core into individual samples and for subsampling is as follows:

- The two cores from a location will be placed into a Teflon "V" shaped board for cutting into individual samples.
- Cut, with a teflon spatula, each core into 6-inch long segments.
- Place a 10- to 15-cc section from each 6-inch segment into a labeled septum vial. These vials will be used for screening.
- Cut each 6-inch segment in half longitudinally.
- Place one half of the 6-inch segment into a sample bottle labeled for organic analysis and the other half into a sample bottle labeled for inorganic analysis.

This procedure will be followed for each of the sampling locations. A diagram of this procedure is shown in Figure 7. A different core tube will be used for each of the three samples. The core tubes will be decontaminated before moving on to another sampling location.

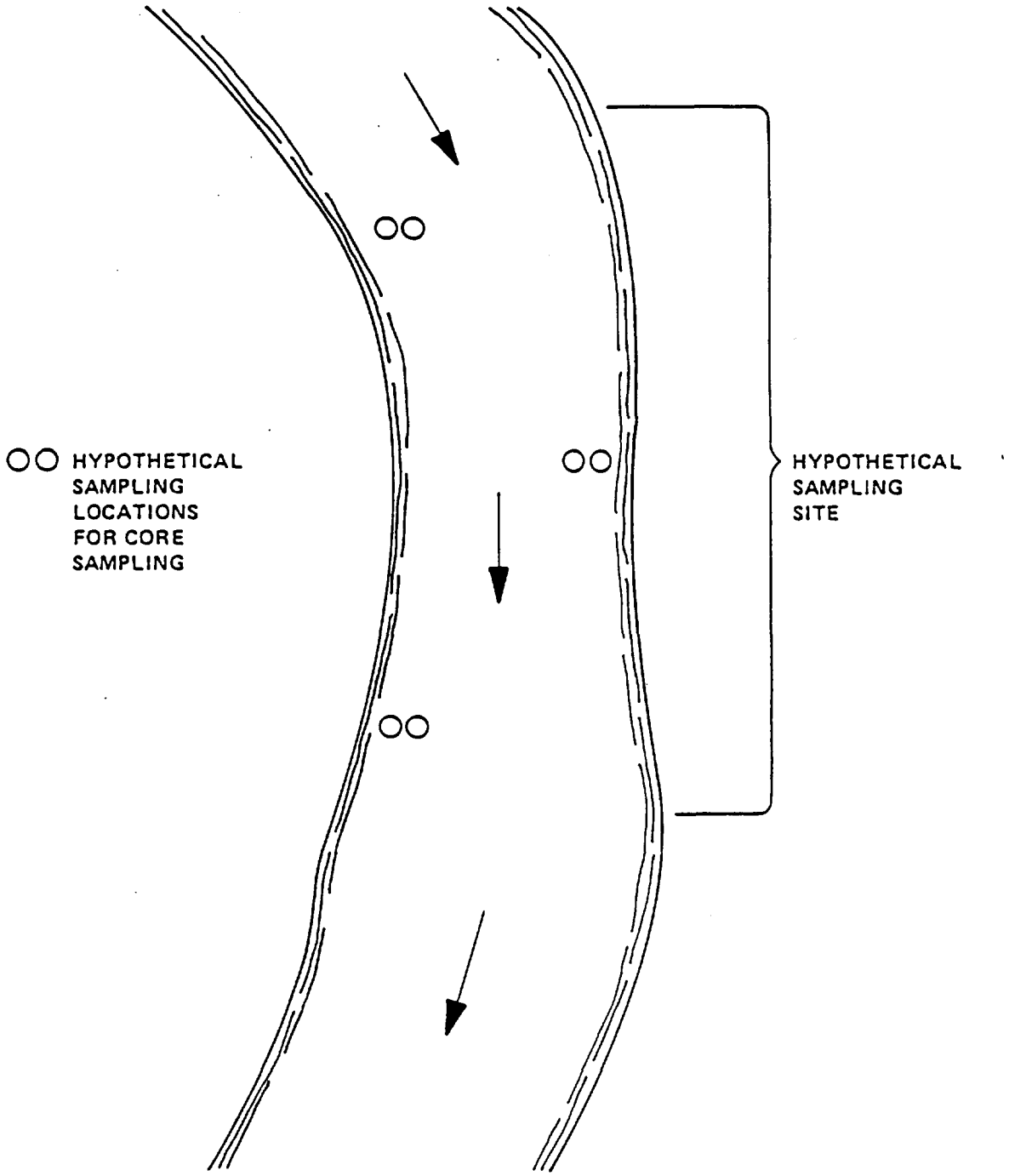
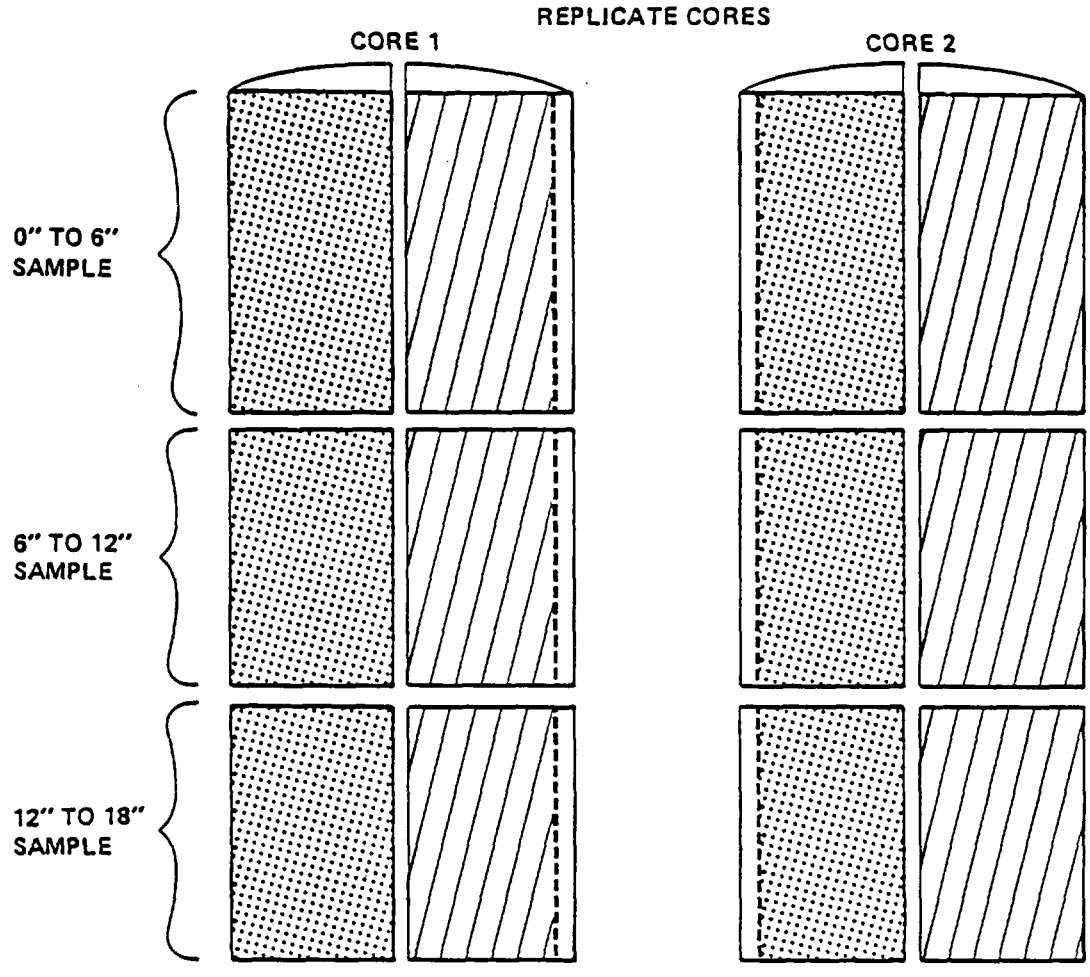


FIGURE 6
DIAGRAM SHOWING HYPOTHETICAL SAMPLING LOCATIONS WITHIN A HYPOTHETICAL SAMPLING SITE
ECC SITE



LEGEND

- SUBSAMPLE FOR ORGANIC ANALYSES
- SUBSAMPLE FOR INORGANIC ANALYSES
- SUBSAMPLE FOR SCREENING

FIGURE 7
DIAGRAMS FOR CUTTING CORES INTO SAMPLES AND SUBSAMPLING
ECC SITE

Surface Water Sampling

A sampling team will collect dry weather samples from the unnamed ditch, Finley Creek and Eagle Creek.

Water samples will be collected with the Kemmer sampler. Where possible, samples will be collected from the upper 0.5 meter of water, mid-depth and the lower 0.5 meter of water. Modifications to this procedure will be made for shallow stream conditions.

All samples will be transferred to appropriate containers with the required volume of water needed using proper preservation techniques. The Kemmer water sampler will be decontaminated between samples.

Staff gauge readings will be taken at the time each sample is taken.

Residential Well Sampling

The sampling team will determine the optimum location for obtaining the well water sample and will operate the well system continuously for a minimum period of 15 minutes. Well water samples will be taken at the selected location transferring the well water directly from the well water system outlet to the sample container. For the volatile organics sample, extreme care must be taken in minimizing aeration of the sample and creation of air pockets in the sample container.

Field Blanks

Field blanks for sediment samples will consist of diatomaceous earth. For water samples, ultra pure distilled water will be used. The field blank sample will be placed into the appropriate sampling equipment, removed from the equipment and then placed into sampling jars.

General Decontamination Procedure

Decontamination of personal gear (boots, gloves, and waders), sample jars and sampling equipment should be as follows:

- Soap wash*
- Clean water rinse
- Distilled water rinse
- Acetone rinse (for sampling equipment only)
- Hexane rinse (for sampling equipment only)

* 1/2 lb of Trisodium Phosphate and 1/2 lb of Sodium Carbonate per gallon of water.

The sample jars will be protected from gross contamination by wrapping them in plastic during sampling operations.

Triple plastic bags will be used for temporary storage of the disposals and washwater. Decontamination procedures are discussed further in the site health and safety assessment.

SCREENING PROCEDURES

Soil and Sediment

Although previous studies have shown that volatile organic compounds are major contaminants at the ECC site, it is probable not all soil and sediment samples will have significant concentrations of contaminants. To reduce analytical costs, a screening procedure will be used to screen soil and sediment samples. Significant concentrations are defined as anything above background.

While volatile organics are not the only contaminants present, they will be used as an indicator of contamination. If they are present in a sample in significant concentrations, the interpretation that other contaminants may also be present will be made and the sample will be sent to the laboratory for a complete analysis.

Because not all contaminants that may be present will be detected by the screening process, one sample from each sampling location will be sent for analysis. In addition, all soil and sediment samples not sent to the laboratory for analysis will be preserved and held for possible future analysis.

Total volatile organics screening will be done using the head space analytical technique with an OVA. This procedure is:

- Vials containing sediment with 25 percent headspace (may be approximate) are allowed to reach the surrounding air temperature. A water bath may be used to accelerate the process, if needed.

- The OVA is started and allowed to run for several minutes to equalibrate the column temperature with the surrounding air temperature. For this process, the BACKFLUSH VALVE must be in the DOWN position. The SAMPLE INJECT valve may be in the UP position if the ambient air is relatively clean or in the DOWN position if interfering volatiles might be present (e.g., dust or exhaust). With the valve in the DOWN position, ambient air will be scrubbed by the activated charcoal filter.

- The gas-tight syringe is flushed several times in "clean" air. A check for syringe cleanliness can be made by inserting the syringe into the injection port of the OVA and slowly depressing the syringe plunger while watching the readout meter. Any injections made with the BACKFLUSH VALVE in the DOWN position will go directly to the FID without going through the column. If the readout meter responds while the blank injection is being made, the syringe is dirty and should be flushed again; a second blank injection should then be made. If the syringe is heavily contaminated, it should be cleaned.

- The gas-tight syringe is used to withdraw vapor from the headspace of the sample. The amount of vapor withdrawn is dependent on the anticipated concentration of contaminants. For example, 500 ul would be recommended starting volume for a sediment from a control area, whereas 250 ul would be a starting volume for a suspected contaminated area.

Depending on the response of the initial injection, a second injection can be made for confirmation. Up to 5.0 ml may be needed for concentrations in the low part-per-billion range. Highly concentrated samples may yield a response even before the plunger is depressed, since the vapor diffuses rapidly from the syringe.

- The Strip Chart Recorder is then started up, and the vapor is injected into the GC column injection port. In injecting the sample, it is not important to introduce the sample all at once, as in running a chromatogram. The sample should be introduced relatively slowly to avoid blowing out the flame in the FID. As the syringe plunger is depressed, the needle on the readout meter and the pen (imprinter) on the Strip Chart Recorder will respond to the pressure produced by the injection. This response should not be misinterpreted as a response to the presence of volatiles, which may take place in 1 to 2 seconds.

- If volatiles are present, a "backflush" peak will be recorded, and an upscale response of the needle on the readout meter will be noted. If no volatiles are present, there will be no peak and no response.

- The "backflush" peak height and duration of the upscale response related to the injection size are indicative of the total volatile organic compound concentration in the sample.

- The sample number and injection size will then be recorded directly on the strip chart paper.

- After each sample, the gas-tight syringe should be flushed and a blank injection made to check cleanliness.

DOCUMENTATION

Site Location Procedure

Following sampling location identification, a wood stake (approximately 2" x 2" x 24") will be driven into the ground, allowing approximately 8 to 10 inches of the stake to remain visible above ground. The top portion of the stake will be painted orange and labeled for identification. The label will contain job and site identification, sample number and sample type. The location of each stake will be recorded by use of compass bearing and distances to physical objects.

Photographs

Photographs of the location with respect to surrounding area and relative to objects used to locate the site will be taken. The picture number and roll number (if more than one roll of film is used) will be logged in the field notebook to identify which sampling site is depicted in the photograph. The film roll number will be identified by taking a photograph of an informational sign on the first frame of the roll. This sign would have the job and film roll number written on it so as to identify the pictures contained on the roll.

For example:

ECC
Roll Number 1
Frame Number 1 of 36
June 1, 1983 - Gerald Bills

Field Notebooks

Field notebooks will provide the means of recording data collecting activities performed at a site. As such, entries will be described in as much detail as possible so that anyone going to the site could reconstruct a particular situation without reliance on memory.

Field notebooks will be bound, field survey books. Notebooks will be assigned to field personnel, but will be stored in the document control center when not in use. Each notebook will be identified by the project-specific document number.

The cover of each notebook will contain:

Person or Organization to whom the book is assigned
Book Number
Project Name
Start Date
End Date

Entries into the notebook will contain a variety of information. At the beginning of each entry, the date, start time, weather, all field personnel present, level of personal protection being used onsite, and the signature of the person making the entry will be entered. The names of visitors to the site, all field sampling team personnel and the purpose of their visit will be recorded in the field notebook.

All measurements made and samples collected will be recorded. All entires will be make in ink and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark. Wherever a sample is collected or a measurement is made, a detailed description of the location of the station, which includes compass and distance measurements, shall be recorded. The film roll number and number of photographs taken of the station will also be noted. All equipment used to make measurements will be identified, along with the date of calibration.

Samples will be collected following the procedures documented in this plan. The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth at which the sample was collected, volume and number of containers. In addition, the cooler number into which the sample is placed in the field will be recorded. Sample numbers will be assigned prior to going onsite. Duplicates, which will receive an entirely separate sample number, will be noted under sample description. Significant field notebook entries (samples collected, significant observations) shall be countersigned by another member of the project team.

ORGANIZATION, RESPONSIBILITIES AND TRAINING

Staff Organization

The project team will be organized according to the sampling activity. For onsite sampling work, the actual sampling team makeup will be dependent on the type and extent of sampling and will consist of a combination of the following:

- Site Project Manager
- Site Safety Officer
- Sampling Team Leader
- Sampling Engineer(s)
- Preparation Area Technician(s)
- Decontamination Technician(s)
- Sample Screening Engineer

Staff Responsibilities

Specific responsibilities for sampling team members are described below.

Site Project Manager

The site project manager (SPM) or his designee will be present whenever sampling occurs. The SPM will conduct the site briefing and be responsible for the coordination of all personnel onsite, supplying all safety equipment, and providing assistance where possible. The SPM will also keep a general site log describing activities conducted onsite, personnel entering the site, and general observations regarding site activities.

In the absence of U.S. EPA or ISBH personnel, the SPM will handle public relations contacts only if absolutely required and then only answering questions concerning the work being done in the field.

Site Safety Officer

The site safety officer (SSO) will be designated by CH2M HILL's health and safety officer and will be responsible for

the adherence to all site safety requirements by team members. The safety officer will assist in conducting site briefing meetings and will perform the final safety check. Additional responsibilities are:

- Updating equipment or procedures based upon new information gathered during the site inspection.

- Upgrading the levels of protection based upon site observations.

- Enforcing the "buddy system."

- Determining and posting locations and routes to medical facilities, including poison control centers; arranging for emergency transportation to medical facilities.

- Notifying local public emergency officers, i.e., police and fire departments, of the nature of the team's operations and posting their telephone numbers.

- Entering the exclusion area in emergencies when at least one other member of the field team is available to stay behind and notify emergency services; or after he/she has notified emergency services.

- Examining work party members for symptoms of exposure or stress.

- Providing emergency medical care and first aid as necessary onsite. The SSO has the ultimate

responsibility to stop any operation that threatens the health or safety of the team or surrounding populace.

Sampling Team Leader

The sampling team leader (STL) will be responsible for the coordination of all sampling efforts, will assure the availability and maintenance of all sampling equipment materials, and provide for shipping and packing materials. The STL will supervise the completion of all chain-of-custody records, the proper handling and shipping of the samples collected, be responsible for the accurate completion of the field notebook, and provide close coordination with the SPM.

Sampling Engineer(s)

The sampling engineer(s) (SE) will perform field measurements, collect samples and transfer them for shipping, and clean sampling equipment as directed by the STL.

Preparation Area Technician

The preparation area technician (PAT) will remain in the decontaminated area and will assume custody of samples from the sampling team. The PAT will be responsible for the completion of all chain-of-custody and sample traffic control forms. The PAT will also be responsible for maintaining communications with onsite personnel and logging all communications and site entires and departures.

Sample Screening Engineer

The sample screening engineer (SSE) will be in charge of screening sediment samples with the OVA and will also act as an emergency backup in the event of an accident.

Decontamination Area Technician

The decontamination area technician (DAT) will aid sampling team members with the donning and doffing of protective clothing, with the decontamination of sample containers and equipment, and will also be available to replenish supplies as required.

Training

Field personnel must satisfy general and site-specific training requirements. Personnel involved in onsite work must have successfully completed the 40-hour Hazardous Waste Site Investigation Training Course. In addition, onsite personnel must have successfully completed the American Red Cross Multimedia Standard First Aid and Basic Life Support Course in Cardiopulmonary Recessitation courses. Personnel assigned to operate field equipment must be certified in the operation of the particular equipment they will be using.

For site-specific training, field personnel will receive the Project Sampling Plan, the Site Health and Safety Plan and the Project Work Plan in a timely manner to allow for a sufficient review period. Prior to the initiation of site sampling, a field staff orientation and briefing will be held to acquaint personnel with the site, with the operation of any unfamiliar sampling equipment, and to assign field responsibilities.

Immediately preceding the sampling operation, a second briefing shall be held to reinforce safety precautions required onsite and to perform a final safety check.

All sampling activities will be based on and will be in compliance with the site level of protection classification, as described in the Site Health and Safety Plan.

Sampling Activity Schedule

The sampling activity schedule is shown in Table 1. The staff assignments by sampling activity are shown in Table 2.

Table 1
SAMPLING SCHEDULE
ECC
W65230.C3

TENTATIVE DATE	DAY	ACTIVITY
5/9/83	1	Travel
5/10/83	2	Set up - Residential Well Sampling
5/11/83	3	Travel
7/25/83	1	Travel
7/26/83	2	Set up - Recon Survey
7/27/83	3	Groundwater, Surface Water and Sediment Sampling
7/28/83	4	Groundwater, Surface Water and Sediment Sampling
7/29/83	5	Cleanup - Travel
10/10/83	1	Travel - Recon Survey
10/11/83	2	Soil Sampling
10/12/83	3	Soil Sampling
10/13/83	4	Soil Sampling
10/14/83	5	Travel

GLT424/20

Table 2
STAFF ASSIGNMENTS BY SAMPLING ACTIVITY
ECC
W65230.C3

Sampling Activity	SPM	SSO	STL	SE	PAT	DAT	SSE
Recon. Survey	DT	IJ	TG	DT	LK	TG	-
Sediment Sampling	DT	DT	JB	TG	LK	TG	JB
Freshwater Sampling	DT	DT	JB	TG	LK	TG	-
Residential Well Sampling	DT	DT	JB	TG	LK	JB	-
Groundwater Sampling	DT	IJ	TG	DT	LK	TG	-
Soil Sampling	DT	IJ	TG	TG	LK	TG	JB

KEY

CH2M HILL Personnel:

JB = Jerry Bills
TG = Tom Gilgenbach
IJ = Ike Johnson
LK = Linda Keppert
DT = Dennis Totzke

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Appendix A
SAMPLE QUANTITIES, BOTTLES, AND PRESERVATIVES
FOR SEDIMENT AND WATER SAMPLES
ECC
W65230.C2

ORGANIC

Water

- Low Concentration

  One 1-gallon glass bottle, two 0.5-gallon glass or four 1-liter glass bottles (Teflon-lined cap); iced to 4°C.

  Two 40-ml glass volatile organic analysis (VOA) vials (duplicates); iced to 4°C (Teflon-lined cap). No headspace.

- Medium Concentration

  One 8-ounce glass wide-mouth bottle (Teflon-lined caps) filled three-fourths full. No ice. Note: Collect a 1- or 2-liter sample when total concentrations or fractions are suspected in the low range.

- High Concentration

  One 8-ounce glass wide-mouth bottle (Teflon-lined cap) filled half full. No ice.

Sediments

- Low Concentration

  One 8-ounce glass wide-mouth bottle (Teflon-lined cap) iced to 4°C (filled no more than three-fourths full)

- Medium Concentration

  One 4-ounce glass wide-mouth bottle (Teflon-lined cap) filled three-fourths full. No ice.

- High Concentration

  One 8-ounce glass wide-mouth bottle (Teflon-lined cap) filled half full. No ice.

INORGANICS

Water

- Low Concentration

  One 1-liter high density polyethylene bottle (metals, 3 ml 1:1 HNO_3 preservative)

  One 360-ml high density polyethylene bottle (Mercury, 2 ml of HNO_3 + $K_2Cr_2O_7$ preservative)

  One 500-ml high density polyethylene bottle (NH_3Y + TOC, 2 ml 1:1, H_2SO_4 preservative, iced to 4°C)

  One 500-ml high density polyethylene bottle (pH F-, General Chem., no preservative, iced to 4°C)

  One 1-liter high density polyethylene bottle (CN^-, 5 ml 6N NaOH preservative, iced to 4°C)

  One 1-liter high density polyethylene bottle ($S^=$, 8 ml, Zinc acetate preservative, iced to 4°C)

  One 1-quart glass wide-mouth bottle (Oil/Grease, 10 ml 1:1 H_2SO_4 preservative)

  One 1-liter high density polyethylene bottle (Phenols, 10 ml $CuSO_4$ - H_3PO_4 preservative, iced to 4°C)

- Medium and High Concentration

  One 8-ounce glass wide-mouth bottle (Teflon-lined cap) filled half full. No ice or preservatives.

Sediments

- Low and Medium Concentrations

  One 4-ounce glass wide-mouth bottle (Teflon-lined cap) filled three-fourths full. No ice or preservatives.

- High Concentration

  One 8-ounce glass wide-mouth bottle (Teflon-lined cap) filled half full. No ice or preservatives.

GLT301/50

Appendix B

U.S. ENVIRONMENTAL PROTECTION AGENCY - CLP Sample Management Office
P.O. Box 818, Alexandria, Virginia 22313 - 703/557-2490

Sample Number

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: _____ Case No: _____

Lab Sample I.D. No: _____ QC Report No: _____

Multiply Detection Limits by 1 ☐ or 10 ☐ (Check Box for Appropriate Factor)

ACID COMPOUNDS

PP #	CAS #		ug/l or ug/kg (circle one)
(21A)	88-06-2	2,4,6- trichlorophenol	
(22A)	59-50-7	p-chloro-m-cresol	
(24A)	95-57-8	2- chlorophenol	
(31A)	120-83-2	2,4-dichlorophenol	
(34A)	105-67-9	2,4-dimethylphenol	
(57A)	88-75-5	2- nitrophenol	
(58A)	100-02-7	4-nitrophenol	
(59A)	51-28-5	2,4-dinitrophenol	
(60A)	534-52-1	4,6-dinitro-2-methylphenol	
(64A)	87-86-5	pentachlorophenol	
(65A)	108-95-2	phenol	

BASE/NEUTRAL COMPOUNDS

(1B)	83-32-9	acenaphthene
(5B)	92-87-5	benzidine
(8B)	120-82-1	1,2,4-trichlorobenzene
(9B)	118-74-1	hexachlorobenzene
(12B)	67-72-1	hexachloroethane
(13B)	111-44-4	bis(2-chloroethyl)ether
(20B)	91-58-7	2-chloronaphthalene
(25B)	95-50-1	1,2-dichlorobenzene
(26B)	541-73-1	1,3-dichlorobenzene
(27B)	106-46-7	1,4-dichlorobenzene
(28B)	91-94-1	3,3'-dichlorobenzidine
(35B)	121-14-2	2,4-dinitrotoluene
(36B)	606-20-2	2,6-dinitrotoluene
(37B)	122-66-7	1,2-diphenylhydrazine
(39B)	206-44-0	fluoranthene
(40B)	7005-72-3	4-chlorophenyl phenyl ether
(41B)	101-55-3	4-bromophenyl phenyl ether
(42B)	39638-32-9	bis (2-chloroisopropyl) ether
(43B)	111-91-1	bis (2-chloroethoxy) methane
(52B)	87-68-3	hexachlorobutadiene
(53B)	77-47-4	hexachlorocyclopentadiene
(54B)	78-59-1	isophorone
(55B)	91-20-3	naphthalene
(56B)	98-95-3	nitrobenzene
(62B)	86-30-6	N-nitrosodiphenylamine
(63B)	621-64-7	N-nitrosodipropylamine
(66B)	117-81-7	bis (2-ethylhexyl) phthalate
(67B)	85-68-7	benzyl butyl phthalate
(68B)	84-74-2	di-n-butyl phthalate
(69B)	117-84-0	di-n-octyl phthalate
(70B)	84-66-2	diethyl phthalate
(71B)	131-11-3	dimethyl phthalate
(72B)	56-55-3	benzo(a)anthracene

BASE/NEUTRAL COMPOUNDS

PP #	CAS #		ug/l or ug/kg (circle one)
(73B)	50-32-8	benzo(a)pyrene	
(74B)	205-99-2	benzo(b)fluoranthene	
(75B)	207-08-9	benzo(k)fluoranthene	
(76B)	218-01-9	chrysene	
(77B)	208-96-8	acenaphthylene	
(78B)	120-12-7	anthracene	
(79B)	191-24-2	benzo(ghi)perylene	
(80B)	86-73-7	fluorene	
(81B)	85-01-8	phenanthrene	
(82B)	53-70-3	dibenzo(a,h)anthracene	
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	
(84B)	129-00-0	pyrene	

VOLATILES

(2V)	107-02-8	acrolein
(3V)	107-13-1	acrylonitrile
(4V)	71-43-2	benzene
(6V)	56-23-5	carbon tetrachloride
(7V)	108-90-7	chlorobenzene
(10V)	107-06-2	1,2-dichloroethane
(11V)	71-55-6	1,1,1-trichloroethane
(13V)	75-34-3	1,1-dichloroethane
(14V)	79-00-5	1,1,2-trichloroethane
(15V)	79-34-5	1,1,2,2-tetrachloroethane
(16V)	75-00-3	chloroethane
(19V)	110-75-8	2-chloroethylvinyl ether
(23V)	67-66-3	chloroform
(29V)	75-35-4	1,1-dichloroethene
(30V)	156-60-5	trans-1,2-dichloroethene
(32V)	78-87-5	1,2-dichloropropane
(33V)	10061-02-6	trans-1,3-dichloropropene
	10061-01-05	cis-1,3-dichloropropene
(38V)	100-41-4	ethylbenzene
(44V)	75-09-2	methylene chloride
(45V)	74-87-3	chloromethane
(46V)	74-83-9	bromomethane
(47V)	75-25-2	bromoform
(48V)	75-27-4	bromodichloromethane
(49V)	75-69-4	fluorotrichloromethane
(50V)	75-71-8	dichlorodifluoromethane
(51V)	124-48-1	chlorodibromomethane
(85V)	127-18-4	tetrachloroethene
(86V)	108-88-3	toluene
(87V)	79-01-6	trichloroethene
(88V)	75-01-4	vinyl chloride

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ORGANICS ANALYSIS DATA SHEET - Page 2

Sample Number

Laboratory Name: _____ Case No: _____

b Sample I.D. No: _____ QC Report No: _____

Multiply Detection Limits by 1 ☐ or 10 ☐ (Check Box for Appropriate Factor)

PESTICIDES

PP #	CAS #		ug/l or ug/kg (circle one)
(39P)	309-00-2	aldrin	
(90P)	60-57-1	dieldrin	
(91P)	57-74-9	chlordane	
(92P)	50-29-3	4,4'-DDT	
(93P)	72-55-9	4,4'-DDE	
(94P)	72-54-8	4,4'-DDD	
(95P)	115-29-7	α-endosulfan	
(96P)	115-29-7	β-endosulfan	
(97P)	1031-07-8	endosulfan sulfate	
(98P)	72-20-8	endrin	
(99P)	7421-93-4	endrin aldehyde	
(100P)	76-44-8	heptachlor	
(101P)	1024-57-3	heptachlor epoxide	
(102P)	319-84-6	α-BHC	

PESTICIDES

PP #	CAS #		ug/l or ug/kg (circle one)
(103P)	319-85-7	β-BHC	
(104P)	319-86-8	δ-BHC	
(105P)	58-89-9	γ-BHC (lindane)	
(106P)	53469-21-9	PCB-1242	
(107P)	11097-69-1	PCB-1254	
(108P)	11104-28-2	PCB-1221	
(109P)	11141-16-5	PCB-1232	
(110P)	12672-29-6	PCB-1248	
(111P)	11096-82-5	PCB-1260	
(112P)	12674-11-2	PCB-1016	
(113P)	8001-35-2	toxaphene	

DIOXINS

(129B)	1746-01-6	2,3,7,8-tetrachlorodibenzo-p-dioxin	

Non-Priority Pollutant Hazardous Substances List Compounds

ACID COMPOUNDS

CAS #		ug/l or ug/kg (circle one)
65-85-0	benzoic acid	
95-48-7	2-methylphenol	
108-39-4	4-methylphenol	
95-95-4	2,4,5-trichlorophenol	

BASE/NEUTRAL COMPOUNDS

62-53-3	aniline	
100-51-6	benzyl alcohol	
106-47-8	4-chloroaniline	
132-64-9	dibenzofuran	
91-57-6	2-methylnaphthalene	
88-74-4	2-nitroaniline	
99-09-2	3-nitroaniline	
100-01-6	4-nitroaniline	

VOLATILES

CAS #		ug/l or ug/kg (circle one)
67-64-1	acetone	
78-93-3	2-butanone	
75-15-0	carbondisulfide	
519-78-6	2-hexanone	
108-10-1	4-methyl-2-pentanone	
100-42-5	styrene	
108-05-4	vinyl acetate	
95-47-6	o-xylene	

US ENVIRONMENTAL PROTECTION AGENCY
HWI Sample Management Office
P.O. Box 818 – Alexandria, Virginia 22313
703/557-2490 FTS 8-557-2490

Sample No.

INORGANICS ANALYSIS DATA SHEET

LAB NAME _____ CASE NO. _____

LAB SAMPLE ID. NO. _____ QC REPORT NO. _____

TASK 1 (Elements to be Identified and Measured)

		ug/l or mg/kg (circle one)			ug/l or mg/kg (circle one)
1.	Aluminum		10.	Zinc	
2.	Chromium		11.	Boron	
3.	Barium		12.	Vanadium	
4.	Beryllium		13.	Silver	
5.	Cobalt				
6.	Copper				
7.	Iron				
8.	Nickel				
9.	Manganese				

TASK 2 (Elements to be Identified and Measured)

		ug/l or mg/kg (circle one)			ug/l or mg/kg (circle one)
1.	Arsenic		5.	Mercury	
2.	Antimony		6.	Tin	
3.	Selenium		7.	Cadmium	
4.	Thallium		8.	Lead	

TASK 3 (Elements to be Identified and Measured)

		ug/l or mg/kg (circle one)
1.	Ammonia	
2.	Cyanide	
3.	Sulfide	

COMMENTS: